GILBARCO VEEDER-ROOT

Encore® and Eclipse®

Start-up/Service Manual

MDE-3804B

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Approvals

Gilbarco is an ISO 9001:2000 registered company.

Underwriters Laboratories:

U L File#	Products listed with U L
MH1941	All Gilbarco pumps and dispensers that bear the U.L. listing mark.
MH8467	Transac System 1000 and PAM 1000
E105106	Dell DHM Minitower
E165027	G-SITE and Passport Systems

New York City Fire Department (NYFD):

NYFD C of A #	Product
4805	The Advantage Series and Legacy Series
4986	Encore and Eclipse

California Air Resources Board (CARB):

Executive Order #	Product
G-70-52	Balance Vapor Recovery
G-70-150-AB	VaporVac

National Conference of Weights and Measures (NCWM) - Certificate of Conformance (CoC):

Gilbarco pumps and dispensers are evaluated by the National Conference of Weights and Measures (NCWM) under the National Type Evaluation Program (NTEP). NCWM has issued the following Certificates of Compliance (COC):

CoC#	Product	Model #	CoC#	Product	Model #	CoC#	Product	Model #
02-019	Encore	Nxx	02-026	H111B Series	AC, RAC	02-034	External Mount CRIND	CECXXXXXXX
02-020	Eclipse	Exx	02-027	MPD-1 Series	AN, RAN	02-035	Dimension	Dxx
02-021	T-12C Console	PA0188, RA0188		Fixed Blender	AF, RAF, AG, RAG	02-036	Legacy	Jxxx
	T-12C Console	PA0203, RA0203		Dispenser - Low Profile	AR, RAR	02-037	G-SITE Printer (Epson)	PA0307
02-022	T-12G Console	PA0180, RA0180	02-028	Indoor Card	Q11640		G-SITE Distribution Box	PA0306
02-023	T-15 Console	PA0189		Outdoor Card	Q11891		G-SITE Keyboard	PA0304
	T-15 Controller C2	PA0211	02-029	CRIND	—		G-SITE Mini Tower	PA0301
02-024	T-15 Controller	PA0190	02-030	TS-1000 Console	PA0240		G-SITE Monitor	PA0303
	ProBlender	AU, RAU		TS-1000 Controller	PA0241		G-SITE Printer (Citizen)	PA0308
	Precision Blender	AE, RAE		Distribution Box	PA0242	02-038	C+ Meter	T19976
	Dispenser - Standard	AK, RAK		Micro-T Console	PA0250	02-039	Passport	PA0324
	Dispenser - Low Profile	AL, RAL		Meter - EC Series	PA024EC10	02-040	Ecometer	T20453
	Fixed Blender	AP, RAF		VaporVac Kits	CV			
02-025	Meter - C Series	PA024NC10	02-031	The Advantage Series	Bxx, RBxx			
	Meter - C Series	PA024TC10	02-032	Trimline Series	AA, RAA			
	Salesmaker ProBlender	AB, RAB	02-033	Meter - C Series	PA024XC10			
99-165	Salesmaker Series 2/2H/4/4A	AM		MPD-A3 Series	AD, RAD			

Patents

Gilbarco Inc. products are manufactured or sold under one or more of the following U.S. patents.:

Dispensers

4,566,504 4,556,927 4,570,686 4,687,033 4,728,788 4,748,846 4,781,066 4,793,589 4,799,940 4,805,453 4,876,653 4,890,210 4,913,813 4,930,665
4,934,565 4,938,054 4,938,251 4,939,730 4,967,366 4,978,029 4,986,445 5,013,434 5,029,100 5,040,577 5,083,846 5,098,179 5,099,403 5,110,010
5,134,548 5,156,199 5,269,353 5,228,084 5,325,706 5,345,979 5,355,915 5,363,988 5,384,850 5,407,115 5,417,256 5,448,638 5,561,715 5,450,883
5,452,750 5,464,466 5,493,315 5,501,246 5,514,933 5,515,390 5,535,130 5,542,458 5,543,849 5,546,981 5,557,084 5,571,310 5,592,979 5,602,745
5,561,715 5,602,745 5,626,649 5,630,528 5,708,580 5,719,779 5,719,781 5,720,325 5,724,067 5,734,851 5,755,854 5,782,275 5,794,667 5,798,931
5,803,136 5,843,212 5,857,500 5,868,179 5,871,651 5,890,520 5,898,141 5,954,080 5,956,259 5,969,691 5,971,042 5,979,705 5,980,090 5,992,395
5,996,888 6,026,866 6,026,868 6,032,126 6,052,629 6,054,940 6,062,473 6,065,507 6,065,638 6,067,476 6,070,156 6,073,840 6,078,888 6,078,896
6,082,415 6,085,775 6,087,954 6,092,410 6,098,879 6,102,085 6,116,505 6,119,110 6,123,118 6,149,033 6,157,871 6,170,539 6,176,421 6,184,846
6,185,307 6,185,893 6,196,065 6,227,227 6,244,310 6,250,151 6,253,779 6,263,319 6,275,746 6,296,148 6,302,165 6,313,737 6,325,112 6,326,934
6,336,479 6,338,369 6,347,649 6,352,176 6,357,493 6,360,137 6,363,299 6,364,206 RE35,238 D262,971 D265,092 D306,719 D309,144 D316,471
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D421,612 D422,285 D422,604 D426,555 D428,424 D428,897 D429,739 D429,740 D432,140 D432,548 D432,552 D433,032 D433,033 D433,034
D433,035 D433,036 D433,037 D433,685 D433,686 D435,051 D440,579 D443,624

Point of Sale/Back Office Equipment

4,967,366 5,228,084 5,448,638 5,561,715 5,798,931 5,980,090 5,493,315 5,708,580 5,719,779 5,719,781 5,724,067 5,734,851 6,032,126 6,067,527
6,073,840 6,078,888 6,116,505 6,185,307 6,263,319 6,275,746 6,326,934 6,360,137 6,363,299 6,364,206

Additional U.S. and foreign patents pending.

Trademarks

Non-registered trademarks

C-PAM™	G-SITE® Lite™	Surge Management System™
ECR™	Highline™	Tank Monitor™
EMC™	MultiLine™	TCR™
G-CAT™	Optimum™ Series	Ultra-Hi™
Gilbert™	PAM™ 1000	ValueLine™
G-Poll™ Interface	PAM™	
SmartPad™	SMART Connect™	

Registered trademarks

Dimension® Series	The Advantage® Series	Eclipse®
Gilbarco®	Transac®	TRIND®
InfoScreen®	Trimline®	Passport®
Legacy®	VaporVac®	CRIND®
Making Things Better®	G-SITE®	Performer®
MPD®	Transac® System 1000	InfoScreen®
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1 – Read this First

Introduction

Important Information about Releases

Sections of this manual may be released independently of each other to supply the most current data. Information about release date and version for independently released sections will be included in the section title and footer of the document. Refer to the Gilbarco Online document resource “GOLD” for the latest update.

This section was last updated in August 2007.

Purpose

Sections of this manual combine to provide start-up and service information for Encore® and Eclipse® series units. This manual is a general service guide and not a replacement for Gilbarco-certified training. Certified training includes instructions regarding safety procedures, use of test equipment and common tools, wiring requirements, and electrical service procedures. This section contains a general introduction section, service protocol, safety and model number information.

Chapters in this manual cover the following topics.

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Related Documents

The following documents may be helpful when servicing Gilbarco equipment. Refer to P-1362 for a complete list of available documents. Contact the Literature Department (336-547-5661) for information regarding Gilbarco documentation.

Document Number	Title	GOLD Library
MDE-2183	Warranty Form	Domestic Warranty and Owner's Manuals
MDE-2540	The Advantage, Legacy and MPD Series Owner's Manual	Advantage and Legacy Models
MDE-2755	Gilbarco STP Control and Dispenser Isolation Relay Box PA0287	Encore and Eclipse The Advantage and Legacy Models
MDE-3026	Standardized Service Coding/Terminology	Gilbarco Forms
MDE-3802	Encore and Eclipse Site Preparation	Site Preparation
MDE-3860	Encore and Eclipse Programming Quick Reference Card	Encore and Eclipse
MDE-3985	Encore Installation Manual	Encore and Eclipse
MDE-3986	Eclipse Installation Manual	Encore and Eclipse
MDE-4226	Encore and Eclipse Installation Checklist	Encore and Eclipse
MDE-4227	Encore and Eclipse Start-up Checklist	Encore and Eclipse
MDE-4228	Encore and Eclipse Commissioning Checklist	Encore and Eclipse
P-1362	Gilbarco Literature Guide	Find a Document
PT-1936	Encore Series Pump and Dispenser Illustrated Parts Manual	Encore and Eclipse Parts Manual
PT-1937	Encore and Eclipse Recommended Spare Parts	Encore and Eclipse Parts Manual
PT-1938	Eclipse Illustrated Parts Manual	Encore and Eclipse Parts Manual
RP100-90	PEI Recommended Practices for Underground Liquid Storage Systems	N/A

Note: In addition to these documents, Gilbarco Product Service Bulletins (PSBs) and the monthly newsletter - "ASC Update" are excellent sources of service information.

Who Should Use this Manual

This manual is intended for Gilbarco Authorized Service Contractors (ASCs) who have been trained and certified (on completion of Gilbarco-certified Training Courses). These ASCs should be aware of basic troubleshooting techniques, such as reading a volt/ohm meter, reading pressure, and so on and understand the differences in Gilbarco products, options and functionality.

If you have not been through Gilbarco training, contact the Gilbarco Training Department.

Service Protocol

Requesting Further Technical Assistance

A Service Technician requesting technical assistance should do the following:

1. Be at the site.

2. Have the following available when placing the call:
   - Unit model and serial number
   - Site name and telephone number
   - Your technician number
   - Problem description and history
   - All required recommended spare parts
   - Manuals available for reference

3. Call the Technical Support department (1-800-743-7501).
   Refer to the Customer Service Report (CSR) number if previously assigned.

Using Replacement Parts

Use only genuine Gilbarco replacement parts. Use of other parts will void warranty and could affect unit conformance to various national, local, or state codes.

Whom to Contact at Gilbarco

For this type of information	Call the following phone numbers
Schedule Training	Gilbarco Training Department at (336) 547-5743
Technical Assistance	Gilbarco Technical Support at 1-800-743-7501
Warranty Service and information	Gilbarco Tele-Support at 1-800-800-7498
Explanation of Gilbarco's Warranty Policy	Contact your local Gilbarco distributor for assistance
Technical Literature, Parts Manuals, and other documents	Gilbarco Literature Department at (336) 547-5661

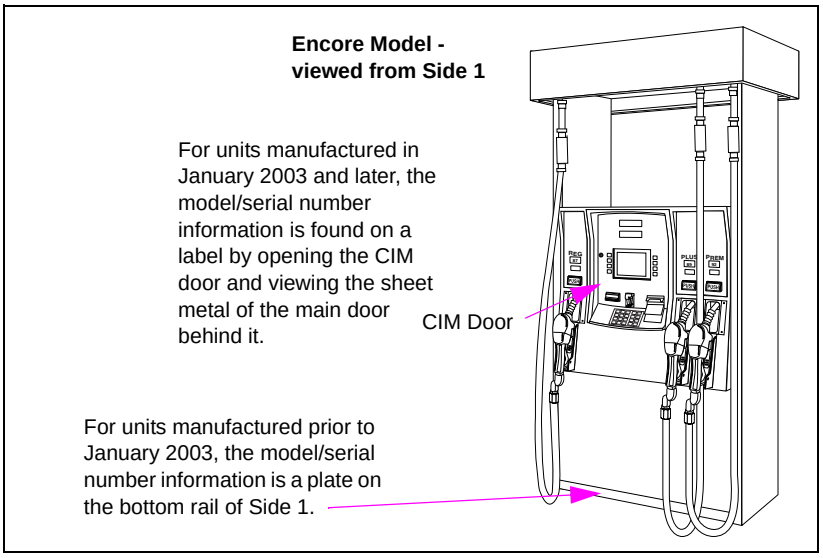
Model Information

Where to Find Model Information on Unit

Depending on the date of manufacture, Encore and Eclipse series units will have the model/serial number information located in different areas of the unit. The following information describes where to find the model/serial numbers, examples of the format, and the coding pertaining to model and date numbers.

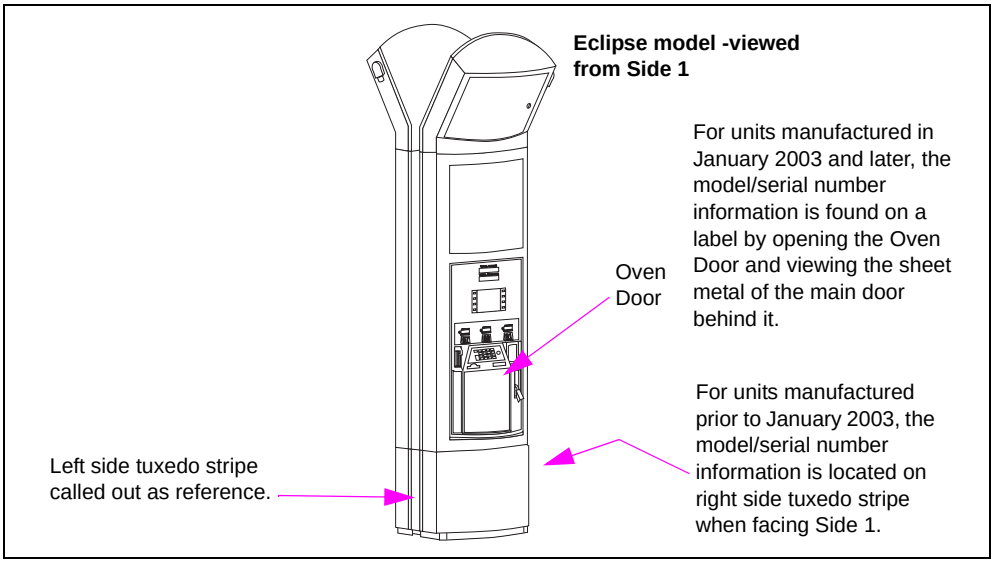
Encore

Figure 1-1: Encore Model/Serial Number Information Locations


Encore Model - viewed from Side 1
For units manufactured in January 2003 and later, the model/serial number information is found on a label by opening the CIM door and viewing the sheet metal of the main door behind it.
CIM Door
For units manufactured prior to January 2003, the model/serial number information is a plate on the bottom rail of Side 1.

Eclipse

Figure 1-2: Eclipse Model/Serial Number Information Locations


Eclipse model -viewed from Side 1
For units manufactured in January 2003 and later, the model/serial number information is found on a label by opening the Oven Door and viewing the sheet metal of the main door behind it.
Oven Door
For units manufactured prior to January 2003, the model/serial number information is located on right side tuxedo stripe when facing Side 1.
Left side tuxedo stripe called out as reference.

Model/Serial Number Tag Formats

Figure 1-3: Model/Serial Number Example for Units Manufactured Prior to January 2003

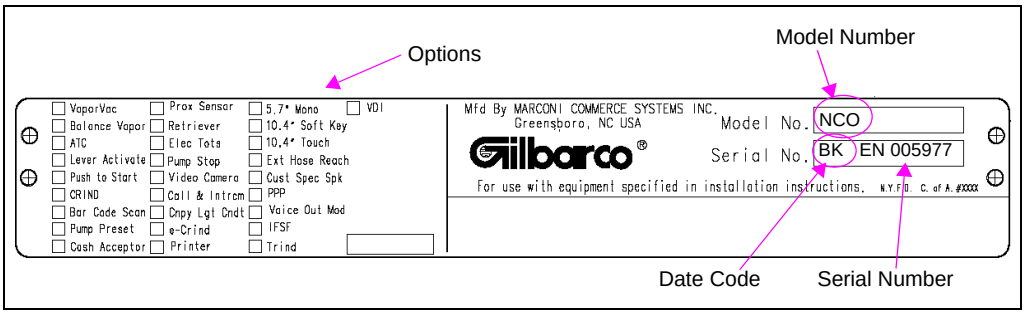
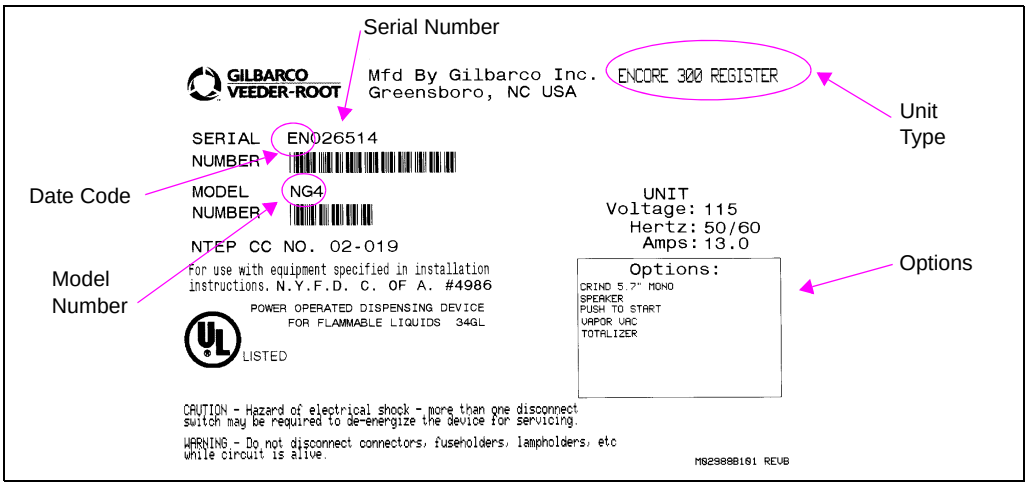


Figure 1-4: Model/Serial Number Example for Units Manufactured in January 2003 and Later



Definitions of Fields

Term	Definition
Model Number	Contains Unit configuration information
Options	The Options is a list of customer-driven options per unit
Serial Number	The Serial Number identifies the unit by customer
Unit Type	The Unit Type provides the type of unit, for example, Encore 500 or Eclipse

Model Codes

Encore

The Model Number provides information on the configuration and options of the unit. In the example in Figure 1-3 on page 1-5, the model number NCO corresponds to an Encore Unit, Type (Pump) and multi-hose, single grade unit, where in the following table:

N = represents an Encore unit (first column of data)
C = multi-hose pump (second column of data)
O = represents 1 grade (third column of data)

Refer to the following table to determine the model code on a Gilbarco pump or dispenser.

N	X	X
Encore	**A** = Multi-Hose Dispenser	**0** = 1 Grade **1** = 2 Grade **2** = 3 Grade **3** = 4 Grade
	C = Multi-Hose Pump	**0** = 1 Grade **1** = 2 Grade **2** = 3 Grade **3** = 4 Grade
	G = Single-Hose	**0** = 3 Grade Dispenser **1** = 3 Grade + 1 Dispenser **2** = 3 Grade Pump **3** = 3 Grade Pump + 1 **4** = 2 Grade Single-Hose MPD **5** = 2 Grade Single-Hose Pump
	J = Multi-Hose Blender	**0** = 3 Grade Blender Dispenser **1** = 3 Grade Blender Pump **2** = 4 Grade Blender + 1 Dispenser **3** = 4 Grade Blender + 1 Pump
	L = X+1 Blender	**0** = 2 + 1 Grade Blender Dispenser **1** = 3 + 1 Grade Blender Dispenser **2** = 4 + 1 Grade Blender Dispenser **4** = 2 + 1 Grade Blender Pump **5** = 3 + 1 Grade Blender Pump **6** = 4 + 1 Grade Blender Pump
	N = X+0 Blender	**1** = 3 + 0 Grade Blender Dispenser **2** = 4 + 0 Grade Blender Dispenser **3** = 5 + 0 Grade Blender Dispenser **5** = 3 + 0 Grade Blender Pump **6** = 4 + 0 Grade Blender Pump **7** = 5 +0 Grade Blender Pump
	P = High Flow (1 Grade)	**3** = Ultra-Hi Master **4** = Ultra-Hi Combo **5** = Ultra-Hi Satellite **6** = Ultra-Hi Master - Single Sided Dual Product **8** = Ultra-Hi Satellite - Single Sided Dual Product
	R = Special	**0** = No Hydraulics **1** = Robot **2** = Simulator **3** = Pumpless Pump **4** = No Electronics

Eclipse

The model number provides information on the configuration and options of the unit. For units with totalizers installed in tuxedo stripe (see Figure 1-2 on page 1-4 for stripe location), totalizer will always be on left tuxedo stripe when facing Side 1.

Note: If unit does not have a totalizer, do not assume side location by unused knockouts in tuxedo stripe. All tuxedo stripes have totalizers knockouts, whether a totalizer can be installed or not.

Model #	Unit Type	Grade/Hoses
EG0	Dispenser Single Hose	3 Grade, 2 Hose
EL0	Blender Dispenser X+1	2+1 Grade, 4 Hose
EL1		3+1 Grade, 4 Hose
EL2		4+1 Grade, 4 Hose
EL3		5+1 Grade, 4 Hose
EN0	Blender Dispenser X+0	2+0 Grade, 2 Hose
EN1		3+0 Grade, 2 Hose
EN2		4+0 Grade, 2 Hose
EN3		5+0 Grade, 2 Hose

Date Codes

The date code provides the month and year of manufacture. In the example in Figure 1-3 on page 1-5, an Encore unit stamped BK was built in February 2001. Use the chart below as reference to determine date codes.

Month Codes		
A = January	E = May	J = September
B = February	F = June	K = October
C = March	G = July	L = November
D = April	H = August	M = December
Year Code		
H = 1999		
	N = 2004	T = 2008
K = 2001	P = 2005	U = 2009
L = 2002	R = 2006	W = 2010
M = 2003	S = 2007	X = 2011

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2 – Important Safety Information

This section introduces the hazards and safety precautions associated with installing, inspecting, maintaining or servicing this product. Before performing any task on this product, read this safety information and the applicable sections in this manual, where additional hazards and safety precautions for your task will be found. Fire, explosion, electrical shock or pressure release could occur and cause death or serious injury, if these safe service procedures are not followed.

Preliminary Precautions
You are working in a potentially dangerous environment of flammable fuels, vapors, and high voltage or pressures. Only trained or authorized individuals knowledgeable in the related procedures should install, inspect, maintain or service this equipment.

Emergency Total Electrical Shut-Off
The first and most important information you must know is how to stop all fuel flow to the pump/dispenser and island. Locate the switch or circuit breakers that shut off all power to all fueling equipment, dispensing devices, and Submerged Turbine Pumps (STPs).

⚠ WARNING

The EMERGENCY STOP, ALL STOP, and PUMP STOP buttons at the cashier's station WILL NOT shut off electrical power to the pump/dispenser. This means that even if you activate these stops, fuel may continue to flow uncontrolled.

You must use the TOTAL ELECTRICAL SHUT-OFF in the case of an emergency and not the console's ALL STOP and PUMP STOP or similar keys.

Total Electrical Shut-Off Before Access
Any procedure that requires access to electrical components or the electronics of the dispenser requires total electrical shut off of that unit. Understand the function and location of this switch or circuit breaker before inspecting, installing, maintaining, or servicing Gilbarco equipment.

Evacuating, Barricading and Shutting Off
Any procedure that requires access to the pump/dispenser or STPs requires the following actions:

- An evacuation of all unauthorized persons and vehicles from the work area
- Use of safety tape, cones or barricades at the affected unit (s)
- A total electrical shut-off of the affected unit (s)

Read the Manual
Read, understand and follow this manual and any other labels or related materials supplied with this equipment. If you do not understand a procedure, call a Gilbarco Authorized Service Contractor or call the Gilbarco Support Center at 1-800-800-7498. It is imperative to your safety and the safety of others to understand the procedures before beginning work.

Follow the Regulations
Applicable information is available in National Fire Protection Association (NFPA) 30A; *Code for Motor Fuel Dispensing Facilities and Repair Garages*, NFPA 70; *National Electrical Code (NEC)*, Occupational Safety and Hazard Association (OSHA) regulations and federal, state, and local codes. All these regulations must be followed. Failure to install, inspect, maintain or service this equipment in accordance with these codes, regulations and standards may lead to legal citations with penalties or affect the safe use and operation of the equipment.

Replacement Parts
Use only genuine Gilbarco replacement parts and retrofit kits on your pump/dispenser. Using parts other than genuine Gilbarco replacement parts could create a safety hazard and violate local regulations.

Safety Symbols and Warning Words

This section provides important information about warning symbols and boxes.

Alert Symbol

This safety alert symbol is used in this manual and on warning labels to alert you to a precaution which must be followed to prevent potential personal safety hazards. Obey safety directives that follow this symbol to avoid possible injury or death.

Signal Words
These signal words used in this manual and on warning labels tell you the seriousness of particular safety hazards. The precautions below must be followed to prevent death, injury or damage to the equipment:

DANGER: Alerts you to a hazard or unsafe practice which will result in death or serious injury.

WARNING: Alerts you to a hazard or unsafe practice that could result in death or serious injury.

CAUTION with Alert symbol: Designates a hazard or unsafe practice which may result in minor injury.

CAUTION without Alert symbol: Designates a hazard or unsafe practice which may result in property or equipment damage

Working With Fuels and Electrical Energy

Prevent Explosions and Fires
Fuels and their vapors will explode or burn, if ignited. Spilled or leaking fuels cause vapors. Even filling customer tanks will cause potentially dangerous vapors in the vicinity of the dispenser or island.

No Open Fire

Open flames from matches, lighters, welding torches or other sources can ignite fuels and their vapors.

No Sparks - No Smoking

Sparks from starting vehicles, starting or using power tools, burning cigarettes, cigars or pipes can also ignite fuels and their vapors. Static electricity, including an electrostatic charge on your body, can cause a spark sufficient to ignite fuel vapors. Every time you get out of a vehicle, touch the metal of your vehicle, to discharge any electrostatic charge before you approach the dispenser island.

Working Alone

It is highly recommended that someone who is capable of rendering first aid be present during servicing. Familiarize yourself with Cardiopulmonary Resuscitation (CPR) methods, if you work with or around high voltages. This information is available from the American Red Cross. Always advise the station personnel about where you will be working, and caution them not to activate power while you are working on the equipment. Use the OSHA Lockout/ Tagout procedures. If you are not familiar with this requirement, refer to this information in the service manual and OSHA documentation.

Working With Electricity Safely

Ensure that you use safe and established practices in working with electrical devices. Poorly wired devices may cause a fire, explosion or electrical shock. Ensure that grounding connections are properly made. Take care that sealing devices and compounds are in place. Ensure that you do not to pinch wires when replacing covers. Follow OSHA Lockout/ Tagout requirements. Station employees and service contractors need to understand and comply with this program completely to ensure safety while the equipment is down.

Hazardous Materials

Some materials present inside electronic enclosures may present a health hazard if not handled correctly. Ensure that you clean hands after handling equipment. Do not place any equipment in the mouth.

⚠ WARNING

The pump/dispenser contains a chemical known to the State of California to cause cancer.

⚠ WARNING

The pump/dispenser contains a chemical known to the State of California to cause birth defects or other reproductive harm.

In an Emergency

Inform Emergency Personnel

Compile the following information and inform emergency personnel:

- Location of accident (for example, address, front/back of building, and so on)
- Nature of accident (for example, possible heart attack, run over by car, burns, and so on)
- Age of victim (for example, baby, teenager, middle-age, elderly)
- Whether or not victim has received first aid (for example, stopped bleeding by pressure, and so on)
- Whether or not a victim has vomited (for example, if swallowed or inhaled something, and so on)

⚠ WARNING

Gasoline ingested may cause unconsciousness and burns to internal organs.
Do not induce vomiting.
Keep airway open.
Oxygen may be needed at scene.
Seek medical advice immediately.

⚠ WARNING

Gasoline inhaled may cause unconsciousness and burns to lips, mouth and lungs.
Keep airway open.
Seek medical advice immediately.

⚠ WARNING

Gasoline spilled in eyes may cause burns to eye tissue.
Irrigate eyes with water for approximately 15 minutes.
Seek medical advice immediately.

⚠ WARNING

Gasoline spilled on skin may cause burns.
Wash area thoroughly with clear water.
Seek medical advice immediately.

IMPORTANT: Oxygen may be needed at scene if gasoline has been ingested or inhaled. Seek medical advice immediately.

Lockout/Tagout

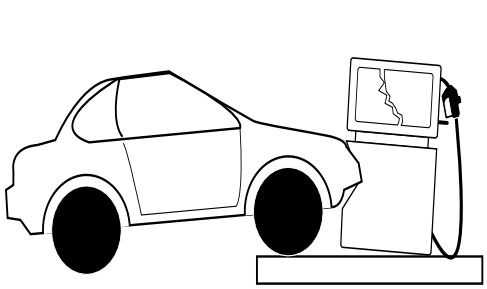
Lockout/Tagout covers servicing and maintenance of machines and equipment in which the unexpected energization or start-up of the machine(s) or equipment or release of stored energy could cause injury to employees or personnel. Lockout/Tagout applies to all mechanical, hydraulic, chemical or other energy, but does not cover electrical hazards. Subpart S of 29 CFR Part 1910 - Electrical Hazards, 29 CFR Part 1910.333 contains specific Lockout/ Tagout provision for electrical hazards.

Hazards and Actions

WARNING

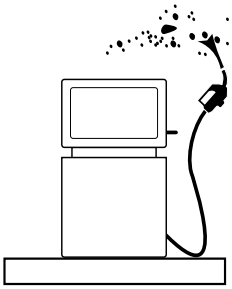
Spilled fuels, accidents involving pumps/dispensers, or uncontrolled fuel flow create a serious hazard.
Fire or explosion may result, causing serious injury or death.
Follow established emergency procedures.

The following actions are recommended regarding these hazards:



Collision of a Vehicle with Unit

Fire at Island



Fuel Spill

- Do not go near a fuel spill or allow anyone else in the area.
- Use station EMERGENCY CUTOFF immediately. Turn off all system circuit breakers to the island(s).
- Do not use console E-STOP, ALL STOP and PUMP STOP to shut off power. These keys do not remove AC power and do not always stop product flow.
- Take precautions to avoid igniting fuel. Do not allow starting of vehicles in the area. Do not allow open flames, smoking or power tools in the area.
- Do not expose yourself to hazardous conditions such as fire, spilled fuel or exposed wiring.
- Call emergency numbers.

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3 – Start-up and Commissioning

About this Section

Gilbarco requires start-up and commissioning of its pumps and dispensers installed in the United States. This procedure ensures proper installation and warranty registration of the equipment. It is also recommended that you follow this procedure outside the United States.

Important Information about Releases

Sections of this manual may be released independently of each other to supply the most current data. Information about release date and version for independently released sections will be included in the section title and footer of the document. Refer to the Gilbarco Online document resource "GOLD" for the latest update.

This section was last updated in August 2007.

Topics in this Section

Topic	Page
Topics in this Section	3-1
Certificate of Conformance Numbers	3-1
Commissioning Instructions	3-2
Sample Install, Start-up and Commissioning Forms	3-3

Certificate of Conformance Numbers

Certificate of Conformance (CoC) numbers are required during installation and start-up of new sites. You may be asked for these numbers by a Weights and Measures official. Use the following table for reference.

Unit Name	Gilbarco CoC Number
Encore	02-019
Eclipse	02-020

Commissioning Instructions

Most of the Encore and Eclipse Commissioning Form (MDE-4228) is self-explanatory. Ensure that you read it entirely before commissioning the site, paying particular attention to instructions and notes. Additional information is supplied to further define some areas and to explain how the Installation Checklist (MDE-4226) Figure 3-1 on page 3-3, the Start-up Checklist (MDE-4227) Figure 3-2 on page 3-4 and the Commissioning Checklist (MDE-4228) Figure 3-3 on page 3-5 are related.

1. The commissioning ASC should have previously read and understood the latest versions of MDE-3804 Encore and Eclipse Service manual, MDE-3985 Encore Installation Manual, MDE-3986 Eclipse Installation Manual, and MDE-3802 the Encore and Eclipse Site Preparation Manual, prior to performing any commissioning.

2. The commissioning ASC should read and be very familiar with the required checks and instructions as outlined under MDE-4226 Form A (Installation Checklist) and MDE-4227 Form B (Start-up Checklist). It will be necessary for the commissioner to clearly explain to the station manager or representative the nature of problems uncovered in the checklists and the implications of not correcting them.

3. In MDE-4228 Encore/Eclipse Commissioning Checklist, under “Model/Serial Numbers” there are check boxes for the commissioner to record whether he/she has obtained Form A and Form B for each unit being commissioned. The checklists are to be left in the electronics cabinet of each individual dispenser by the installing contractor and the start-up ASC. The commissioner should obtain these forms and keep a copy of each as outlined on the individual forms with the MDE-4228 Commissioning Checklist (Form C) for the site. The signed forms should be retained by the commissioning ASC for a minimum of three (3) years.

4. The commissioning ASC is not responsible for completing Form A and Form B for each commissioned unit, nor does the commissioning fee paid by Gilbarco Veeder-Root cover such effort.

5. Should Form A or Form B not be complete or missing for each unit, the commissioner must notify the station manager or representative of the need to have the checklists completed and sent to the commissioner to ensure warranty coverage and proper and safe operation of the equipment.
   Note: Unit problems created by improper installation or start-up are not covered by warranty.

   Upon receipt of the forms, the commissioner will retain the completed form with his commissioning records for the site. The ASC must carry Form A and Form B, in case it is not present in the dispensers.

6. Gilbarco Veeder-Root may request a copy of Form A, Form B or Form C during commissioning “call in”, should a unit be reported as not passing inspection or not having been inspected per Form A or Form B.

7. Under “Required Signatures”, the station manager or representative must read and check either box A or B and then sign Form C. When box B is appropriate, the commissioner should ensure that all details as covered under box B have been explained to the station manager or representative, prior to requesting his/her signature.

Sample Install, Start-up and Commissioning Forms

Figure 3-1: Sample Installation Checklist (MDE-4226)

GILBARCO VEEDER-ROOT

MDE-4226B Encore®/Eclipse® Installation Checklist
(Form A) · May 2006

Site and Installer Information

SITE INFORMATION	INSTALLER INFORMATION
Unit Serial Number	Company Name
Site Name/Number	Company Address
Street	Street
City/State/Zip	City/State/Zip

INSTRUCTIONS: Complete this checklist for each pump/dispenser. Information regarding "Station Electrical" need only be completed on one pump/dispenser form. **After completing the form, leave the original in the pump/dispenser cabinet away from wiring or circuit boards.** Keep the copy for your records.

IMPORTANT NOTE: This checklist does not include all requirements for a safe or proper installation of a pump/dispenser. Included however are certain checks for some of the more important items and items occasionally missed during installation. The installer must read and completely follow the installation manual for equipment installation.

Individual Pump/Dispenser Hydraulic/Mechanical Related:

Item	Procedure	Check if OK/Complete
1	Where required, shear valves installed per manufacturer instructions	
2	Flexible pipe not used within the dispenser. Flexible pipe meeting local and state codes can be used below the dispenser	
3	*Pumps only used with above-ground tanks:* Vacuum-actuated pressure regulating valve installed at the inlet for each product	
4	*Pumps only with in-ground tanks:* Check valve installed for each product inlet	
5	Hose breakaways installed per code and manufacturer recommendations	
6	All hanging hardware is UL® or equivalent listed, CARB certified (where required) and checked for continuity	
7	Unit anchored to the island per installation instructions	
8	Vapor recovery piping has no traps or sags in dispenser sump	
9	Correct nozzles, piping and brand panels used for each grade	
10	All code, regulatory agency or customer-specified safety warning signs, labels or decals have been installed	
11	Hose lengths beyond standard lengths are not being used without special approvals. No more than 6 inches of hose is touching the ground with nozzle in nozzle boot for vacuum-assisted vapor recovery hoses. Vapor balance hoses do not touch the ground.	
12	Purge air from lines using shear valve for pumps and using nozzles for dispensers.	
13	(Encore only) Piping has been secured to the lower piping bracket per installation instructions	
14	Unit and plumbing checked for leaks. No leaks at hanging hardware.	

SAMPLE

Individual Pump/Dispenser Electrical Related:

1	Units without factory installed or factory kit junction boxes only: Conduit into electronic cabinet is potted per installation instructions and no unfilled openings exist between the electronics cabinet and the lower piping area.	
2	Conduit at the base of the unit is potted per local, state and national codes and per the installation manual	
3	Conduit(s) to electronic cabinet for non junction box equipped units is secured to lower brace and potted per installation manual	
4	Field installed junction box is secured to lower frame	
5	Twisted-pair (not shielded) wire used for 2-wire communication for newly wired systems	
6	All wiring to dispenser is stranded copper of gauge and insulation type specified in installation instructions	
7	Ground wires properly connected at pump/dispenser	
8	Contractor supplied conduit and junction box approved for hazardous locations involved and properly sized for wiring and number of connections per codes	
9	All junction box covers replaced and all bolts used and tightened and all openings are plugged	
10	All speaker, intercom and other Class 2 wiring is located in separate conduit and junction box from power wiring	

Station Electrical (Check this section only once per site)

1	Conduit to pumps/dispensers potted per code requirement at station building	
2	Emergency power cutoff is installed per code to remove all power from fueling equipment in case of an emergency	
3	Dispensers only: STP isolation relays used for all dispensers	
4	Grounds to dispensers properly wired per codes and installation instructions	
5	Properly sized circuit breakers for the units and unit options involved	
6	All pump/dispenser wiring properly spaced and isolated from wiring to electrically noisy devices as per the installation manual	
7	Power wiring to dispensers/pumps not shared by other devices	
8	All circuit breakers to pumps/dispensers clearly labeled and readily accessible	
9	All Distribution boxes clearly labeled showing the pump/dispenser connections	
10	All dispensers/pumps wired to the same phase of electrical power	
11	New site wiring to pumps/dispensers was Megger® tested. Old site wiring was continuity and short tested with a digital meter	

Required Signature

Installer Name (Print)	Tech No. (if applicable)
Signature	Date

NOTE: This is a two-part form. Place the top copy (original) in the pump/dispenser away from wiring and circuit boards and keep the bottom copy for your records. An incomplete or missing form may delay commissioning of the unit/site and may void warranty.

Figure 3-2: Sample Start-up Checklist (MDE-4227)

GILBARCO VEEDER-ROOT

MDE-4227B Encore®/Eclipse® Start-Up Checklist

(Form B) · May 2006

Site and Start-Up Technician Information

SITE INFORMATION	START-UP TECHNICIAN INFORMATION
Unit Serial Number	Company Name
Site Name/Number	Company Address
Street	Street
City/State/Zip	City/State/Zip

INSTRUCTIONS: Before powering the unit, the start-up technician/ASC should verify that the unit has been inspected per MDE-4226 Encore/Eclipse Installation Checklist (Form A). Keep the copy of this form for your records and place the original in the unit. The commissioning technician will use this form and MDE-4226 to complete commissioning. Depending upon pre-agreement with the installer, calibration or VaporVac® performance testing may be done by the installer.

IMPORTANT NOTE: This checklist does not include all requirements for a complete start-up of a pump/dispenser. Included however are certain checks for some of the more important items and items occasionally missed during start-up. The start-up technician must read and completely follow the installation manual for the equipment and have a full knowledge of requirements of the station and units involved. Incomplete forms may delay commissioning.

Start-Up Checklist

Item	Procedure	Check if OK/Complete
1	The installation check ist has been completed. Refer to Installation Checklist (MDE-4226)	
2	Unit programmed to station requirements	
3	Backlights, brand panel lights, etc., are all functional	
4	Proper communication with the POS established	
5	Push-to-start and push-to-stop buttons are functional	
6	Pump/dispenser handles and grade select buttons activate the correct STP	
7	PPUs set by the POS match brand panels. PPU for grade in operation is not blanked when handle is raised.	
8	Blender only: Blend ratios set per instructions from site representative	
9	Flow rates do not exceed regulations or codes	
10	Verify meter calibration. Recalibrate as necessary (see “INSTRUCTIONS” above)	
11	CRIND® only: CRIND displays, card readers, cash acceptors, scanners and printers pass diagnostic card testing	
12	Cash Acceptor only: Cash acceptor door switches activate alarms as installed	
13	VaporVac units only: VaporVac passes A/L tests (see “INSTRUCTIONS” above)	
14	ATC equipped units only: Code 303 verifies that each meter temperature is being measured	
15	TRIND® only: Proper response obtained with hand-held and vehicular-mount transponder testers depending upon unit equipment	

SAMPLE

Required Signature

Start-Up Technician Name (Print)	Tech No. (if applicable)
Signature	Date

NOTE: This is a two-part form. Place the top (original) copy in the pump/dispenser away from wiring and circuit boards and keep the bottom copy for your records. An incomplete or missing form may delay commissioning of the unit/site and may void warranty.

Trademarks:
CRIND®, Eclipse®, Encore®, TRIND®, and VaporVac® are registered trademarks of Gilbarco Inc.

Figure 3-3: Sample Commissioning Checklist (MDE-4228)

MDE-4228J Encore®/Eclipse® Commissioning Checklist
(Form C) · October 2006

GILBARCO VEEDER-ROOT

Commissioning SR #

Site Information

SITE INFORMATION	
Site Name/Number	Street
Phone Number	City/State/Zip

INSTRUCTIONS: This form is to be completed by the commissioner. The commissioner is defined as a person with the appropriate Gilbarco training, usually an Authorized Service Contractor (ASC), necessary to complete the commissioning process and train station personnel. MDE-4226 Encore/Eclipse Installation Checklist (Form A) and MDE-4227 Encore/Eclipse Start-Up Checklist (Form B) are prerequisites to this form. The commissioner should retrieve the original and a copy of Form A and Form B from the dispensers/pumps. Give the copy to the station representative and save the original for your records. Keep the original of this commissioning form and Form A and Form B in your records for three years. The commissioner will discuss results of all the checklists with the station manager/supervisor.

IMPORTANT NOTE: The commissioning ASC should verify that the units have been inspected per the Installation Checklist (Form A) and the Start-Up Checklist (Form B). Failure complete all forms may delay commissioning completion and may affect warranty. In case all forms are not complete or available, the commissioner must explain the options for completing commissioning to the station owner.

COMMISSIONING: The commissioner should have all of the required forms and signatures ready and call **1-888-800-7498** to report commissioning. Log the SR# at the top right of form. Do not mail commissioning form. Information is taken over the phone.

Model/Serial Numbers:

	Check if Received				Biodiesel or E85? (Y/N)	Software Versions		
	Form A	Form B	Model Number	Serial Number		Pmp/Disp	CRIND*	Door Node*
1								
2								
3								
4								
5								
6								
7								
8								

* Door Node information is applicable only for Encore 500 and Eclipse units.

POS Type & Name: _____

Blend Ratio Programming:

ONLY REQUIRED IF SPECIFIED BY THE CUSTOMER.: Complete for blenders only. Customer rep. must sign.

Grade Name	Low Product Name	High Product Name	% of Low Product

Customer representative's signature indicates blend ratios listed are same as those provided to the ASC.

Customer Representative _____

Individual Unit Inspections:

Item	Procedure	Check if OK/Complete
1	Installation and start-up checklists have been completed and results reviewed with station manager/supervisor.	
2	All piping is secured to lower piping brace for Encore dispensers/pumps.	
3	Units without factory installed or factory kit junction boxes only: Conduits into electronics cabinet are potted and no unfilled openings exist between the electronics cabinet and the lower piping area.	
4	Minimum wire gauges meet Gilbarco field wiring diagram specifications at pump/dispenser entry.	
5	All wiring is stranded, gas and oil resistant per installation instructions. Ethernet and DSL cables meet requirements per installation instructions.	
6	Twisted-pair wiring used for two-wire data lines for station wide area wiring.	
7	No leaks in hydraulic assembly, hose outlets, hanging hardware.	
8	Units with junction boxes have all junction box covers and all bolts installed.	
9	(Encore 500/Eclipse only) Check software versions and record versions above. If not latest production released versions, install (download from laptop computer) and generate a separate SR # by calling Gilbarco Call Center (1-888-800-7498).	

SAMPLE

Station Requirements (including training for station manager/supervisor):

Item	Procedure	Check if OK/Complete
10	All dispenser/pump wiring properly spaced and isolated from wiring to electrically noisy devices per the installation manual.	
11	Breakers marked with dispenser ID numbers.	
12	A copy of the unit warranty statement and the policy has been reviewed with and given to the station manager/supervisor.	
13	Dispenser emergency shutdown procedures discussed per Owner's Manual.	
14	Reviewed retrieving and reconciling pump totals using manager keypad.	
15	Reviewed price setting procedures using POS and manager keypad.	
16	Reviewed when and how to switch dispensers to stand-alone operation.	
17	Reviewed, for Encore 500/Eclipse V1.8.00 and later software units, security procedures for station approval of programming access by service technicians.	
18	Advised station manager that nondefault PIN (access) codes are to be installed as part of commissioning to enhance security after explaining security benefits and that lost-code additional-service labor will not be covered by warranty. If station refuses to allow nondefault PIN codes to be used, do not modify codes and do not check box to right (will not invalidate warranty).	
19	CRIND device only: Provided USB Printer Maintenance Cards to Manager.	
20	CRIND device only: Reviewed Paper/Jam Removal Procedures, specific paper requirements, and how to order and replace CRIND paper.	
21	Reviewed periodic maintenance inspections (leaks, rust, hanging hardware, belts, etc.) and recommended frequency (see Owner's Manual).	
22	Station manager/supervisor was given an Owner's Manual (MDE-3893/MDE-4516) and received explanation of information in the manual.	
23	Station manager/supervisor received information about non-compliance when all forms were not completed or problems were discovered.	

Required Signatures

Station Manager Information (station manager must check one of the following and sign)

A ☐ I have been advised that all dispensers have been inspected per the checklists and no problems were found needing correction.	**B** ☐ I have been advised that either some equipment inspections have not been completed or problems requiring correction were found during inspections. Should the equipment not have been properly installed, it may be subject to one or more of the following problems: functions improperly, fails prematurely, creates a safety hazard, not covered by warranty. I have further been given information regarding inspections or corrections required. I have also been advised on how to correct these situations and provide results to the commissioning ASC to ensure warranty coverage.

Station Manager Name (print)	Signature	Date
Commissioning ASC Name		
ASC Tech. Number	Signature	Date

NOTE: This is a two-part form. Top (original) - Keep for your records. Second sheet - Give to station manager.

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4 – Preventive Maintenance and Inspection

About this Section

Important Information about Releases

Sections of this manual may be released independently of each other to supply the most current data. Information about release date and version for independently released sections will be included in the section title and footer of the document. Refer to the Gilbarco Online document resource "GOLD" for the latest update.

This section was last updated in August 2007.

Purpose

This section provides information on preventive maintenance and associated inspections.

Section Overview

Preventive maintenance is essential to prevent unexpected downtime of units. The "Suggested Maintenance Chart" on page 4-2 provides maintenance recommendations. The "Sample Maintenance Checklist" on page 4-4 shows a sample of MDE-2856 Site Survey/Preventive Maintenance Checklist, a valuable tool for recording site configuration information and tracking preventive maintenance action taken at the site.

How to Use this Section

Discuss the suggested maintenance items listed in the "Suggested Maintenance Chart" on page 4-2 with the station owner. Review the "Sample Maintenance Checklist" on page 4-4 to familiarize yourself with preventive maintenance tasks that you may have to perform at the site.

Topics in this Section

Topic	Page
Preventive Maintenance Checklists	4-2
Suggested Maintenance Chart	4-2
Sample Maintenance Checklist	4-4

Preventive Maintenance Checklists

Suggested Maintenance Chart

See specific item in the component section for more detailed information. Discuss this information with the station owner. Remind the owner about the importance of preventive maintenance and inspections.

IMPORTANT INFORMATION

Check maintenance instructions for third-party component manufacturers (hoses, nozzles, shear valves, and so on) for their maintenance recommendations. Comply to whatever recommendation is more stringent relative to inspection frequency, and ensure inspection routines include their requirements as well.

Item	Inspection/Procedure	Frequency
General inspection	Inspect all areas of pump/dispenser for damage or sharp edges. Replace any missing warning labels.	Once a week, or upon complaint
Hoses	Inspect for leaks and damage. Inspect hose covering for weakness, splits, cuts, bulges, flattened spots, wet spots, soft spots and reinforcement showing. Look for holes and cuts in vapor recovery hoses. See “Hoses and Flow Restrictors” on page 6-28.	
Hose retrievers	Check for frayed or broken cables and cables wrapped around hoses. See “Testing Hose and Hanging Hardware Continuity” on page 6-31. Check if retractors are operating properly.	
Leaks, external	Inspect all hoses, nozzles, swivels, couplings, casting, and so on. Repair immediately if leak is found.	
Nozzles and boot areas	Inspect for leaks, missing parts and damage. Inspect vapor recovery boots (bellows) for proper seal and damage. Inspect VaporVac nozzle spouts for blockage, loose spouts, and damage (that is, dents). See “Adjusting Nozzle Hook for Specific Nozzles” on page 6-33.	
Breakaways	Inspect for secure connection to hose and for any leaks or wet spots. See “Breakaways” on page 6-29. *Note: Some manufacturer's breakaways are resettable and others require replacement after a drive-off. Refer manufacturer's documentation for information.*	Once a week, or after drive-offs
Leaks, Internal	Inspect all hydraulic connections and seals, including meters, valves, and so on. Repair immediately if wetness or dripping fuel is found. Some staining of parts around seals is normal. Monitor these places more closely.	Once a month, or upon complaint or drive-off occurrence
Filter change and strainer cleaning	See “Servicing Filters” on page 6-23 for detailed instructions. Follow all safety precautions. Frequency of filter changes will depend on fuel and installation cleanliness. Corroded tanks, poor quality fuel, and initial conversion to alcohol-enhanced fuels may require more frequent filter changes and strainer cleanings.	One month or 50,000 gallons after new installs. Every 300,000 gallons or six months thereafter
Wash unit	Refer to MDE-3893, Encore and Eclipse Owners manual for detailed instructions and MDE-4516 Encore S Series Owner's Manual.	Once a month or as needed

Item	Inspection/Procedure	Frequency
Wax units	Refer to MDE-3893, Encore and Eclipse Owners manual for detailed instructions and MDE-4516 Encore S Series Owner's Manual.	Once a month (in harsh environments) or every six months
Stainless steel sheathing and lower doors	For stains on stainless steel, use a cleaner specifically formulated for cleaning stainless steel. Gilbarco recommends Barkeepers Friend. Ensure to thoroughly rinse off the cleaner. Do not spray water/cleaner directly at or into card readers, cash acceptors, or printer chutes.	Once every three months (once a month in harsh environments)
Door locks	Lubricate with a good grade of lock oil.	Every six months
Meters	Check calibration and calibrate if needed. See “About Calibrating Meters” on page 6-21.	
Nozzles, hooks/shafts	Check operation. Clean and lubricate with silicone grease, if necessary.	
Pumps, pulleys, belts, and belt tension	Inspect belts for fraying/cracks. Inspect pulleys for excessive wear in grooves and excessive bearing play. There should be no more than one inch of play on either side of the belt. See “Belts and Pulleys” on page 6-57.	
Shear valves	Check valve operation and lubricate. See “Shear Valves” on page 6-66.	
CRIND Card Reader	Clean card reader using cleaner card Q11482.	Once a week or upon complaint
CRIND Printer	Clean print head using Q13400 printer cleaning card.	Every three months or upon complaint
Display Backlight bulbs and Eclipse ad panel bulbs	Inspect for bad bulbs and replace as necessary.	Once a month
Displays	Inspect and repair as required.	Once a week or upon complaint
Underground piping for sites using VaporVac system	Perform a static pressure decay test. See page 6-70.	Once a year

Sample Maintenance Checklist

GILBARCO VEEDER-ROOT

SITE INSPECTION/PREVENTIVE MAINTENANCE CHECKLIST

Customer's Name _____ **Store #** _____
Manager's Name _____ **Date of Service** _____
Street Address _____ ✓ = OK or Service Performed "O" = Broken, Missing, Etc.
City _____ **Explain All Items Marked "O" In Space Provided**
Phone# (**)** _____ **Type of POS System Installed:** **Passport®** **G-SITE®** **TS-1000™**
Type of Vapor Recovery System Installed _____ **Other POS System** _____

POS PREVENTIVE MAINTENANCE

Workstation #	1	2	3	4	5	6	7	8
1. Clean Printer(s)								
2. Remove Printer Paper Dust								
3. Check Printer Operation								
4. Check for Dedicated Isolated Circuit								
5. Lubricate Cash Drawer Assembly (per AGP spec)								
6. Check Condition of Cables and Power Cords (cuts/frays/bends)								
7. Check Condition of Plugs								
8. Clean Keyboard Case (G-SITE & TS-1000)								
9. Clean & Dust Console & Surrounding Area								
10. Clean Card Reader with Cleaning Card Q12534-170								
11. Check Hard Drive & Note Bad Sectors (G-SITE only)								
12. Clean Floppy Drive with Q13476-101 (see instructions)								
13. Check Presence & Condition of R20391-01 FD Dust Cover (486 & Pentium® G-SITE only)								
14. Vacuum (not blow) Power Supply Air Inlet & Front Bezel								
15. Degauss Monitor (Passport only)								
16. Check UPS Battery (Passport only)								

Workstation #1 Model # _____ Serial # _____
Workstation #2 Model # _____ Serial # _____
Workstation #3 Model # _____ Serial # _____
Workstation #4 Model # _____ Serial # _____
Workstation #5 Model # _____ Serial # _____
Workstation #6 Model # _____ Serial # _____
Workstation #7 Model # _____ Serial # _____
Workstation #8 Model # _____ Serial # _____

PUMP, DISPENSER & CRIND® PREVENTIVE MAINTENANCE

Dispenser #	1	2	3	4	5	6	7	8	9	10	11	12
1. Check Hoses*												
2. Check Nozzles (including Connection to Pumps/ Dispensers), Retaining Springs & Swivels*												
3. Check Breakaway Couplings*												
4. Check Condition of Hose Retrievers (if used)												
5. Check Lamps & Lenses*												
6. Check for Exterior Damage/Rust*												
7. Check Operation/Clean Displays												
8. Lubricate All Locks												
9. Ensure Unit Is Bolted To Island**												
10. Check Bezel & PPU Gaskets												
11. Check Shear Valve Operation, Mounting & Lube												
12. Check Plumbing for Weeps/Leaks												
13. Check for Install Filter Instruction Tag, and Install if Tag is Not Present (see MDE-2215)												
14. Check & Lubricate All Linkages												
15. Ensure Calibration Seals Are Intact												
16. Check Junction Box Bolts/Plugs												
17. Check Pump Handle Switch												
18. Check Vapor Recovery Plumbing**												
19. Check Vapor Recovery Bellows/Hoses for Holes/Cuts/Cracks												
20. Verify that Vapor Recovery System Back Pressure and/or Efficiency has been Tested per Regulatory Agencies												
21. Check Belts On Pumps												
22. Ensure Electrical Panel Circuits Are Clearly Marked												
23. Ensure Free Access To Emergency Cut-off Switch												
24. Check CRIND for Correct Installation & Type of Paper												
25. Check Operation/Clean Card Reader (use Q11482 Cleaning Card, see MDE-3562)												
26. Check Operation/Clean Keypad												
27. Perform CRIND Diagnostics (see MDE-3562)												
28. Verify that Safety Information is Intact/Legible												

Pump #1 Type _____ Model # _____ Serial # _____
Pump #2 Type _____ Model # _____ Serial # _____
Pump #3 Type _____ Model # _____ Serial # _____
Pump #4 Type _____ Model # _____ Serial # _____
Pump #5 Type _____ Model # _____ Serial # _____
Pump #6 Type _____ Model # _____ Serial # _____
Pump #7 Type _____ Model # _____ Serial # _____
Pump #8 Type _____ Model # _____ Serial # _____
Pump #9 Type _____ Model # _____ Serial # _____
Pump #10 Type _____ Model # _____ Serial # _____
Pump #11 Type _____ Model # _____ Serial # _____
Pump #12 Type _____ Model # _____ Serial # _____

SAMPLE

* Notify Dealer
** Only perform this task if a new pump or dispenser has been installed, or if an existing pump or dispenser was removed and replaced

Note any problems w/equipment _____

I certify that all inspections and maintenance items have been performed and problems noted and explained to the Station Manager:

INCIDENT# _____ Date _____ Station Manager _____ Date _____

ASC# _____ ASC Name _____ Tech. Name _____ Tech # _____

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■ White — Contractor Copy ■ Yellow — Customer Copy — Mail to Maintenance Supervisor Weekly ■ Pink — Site Copy ■ Golden Rod — Mail to Gilbarco Inc. F-53

5 – Pump Programming

About this Section

This section provides instructions for programming Encore and Eclipse Series Dispenser pump functions from the Manager Keypad using only the Manager Keypad and the main transaction and grade PPU LCDs for displaying programming information.

Important Information about Releases

Sections of this manual may be released independently of each other to supply the most current data. Information about release date and version for independently released sections will be included in the section title and footer of the document. Refer to the Gilbarco Online document resource "GOLD" for the latest update.

This section last updated August 2007.

Topics in this Section

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	General Programming Information	5-2
	Display Conventions	5-4
	Locating Specific Programming Information	5-5
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	Programming Errors	5-6
	Important Information about Using V1.7.58 and Higher for Encore 5XX and Eclipse Dispensing Pump Software	5-7
Encore 300 Programming Pump/Dispenser	Encore 300 Programming Pump/Dispenser	5-8
	Encore 300 Programming Quick Reference	5-9
	Encore 300 Programming and Data Access Instructions	5-10
	• Level One Command Codes	5-10
	• Level Two Command Codes	5-17
	• Level Three Command Code	5-25
Programming Encore 5XX and Eclipse Series Units	Programming Encore 5XX and Eclipse Series Units	5-39
	Encore 5XX and Eclipse Programming Quick Reference	5-40
	Encore 5XX and Eclipse Programming Instructions	5-41
	• Level One Command Codes	5-41
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	• Level Three Command Codes	5-65
	• Level Four Command Codes	5-88

	Topic	Page
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	Activating the Encore 5XX CRIND Device	5-95
	CRIND Configuration	5-95
	Device Configuration	5-98

General Programming Information

Terms Used in this Section

Term	Definition
6x6x4 Display	Standard display unit for U.S. Market. It is a six-digit money, six-digit volume and a four-digit PPU display.
Allocation	Maximum amount of fuel that can be dispensed from a nozzle for a given transaction.
ASC	Authorized Service Contractor
ATC	Automatic Temperature Compensation
Cold Start	Clears pump and configuration data
Cold Cold Start	E300 procedure that performs a cold start plus clears certain information (watch dog timer state, and so on) not cleared by a normal cold start. *Note: Not commonly performed.*
Command Code	Listing under Command Level for setting software parameters.
Command Level	A level of programming accessed by PIN(s)
Dispenser	In this document, “dispenser” is used interchangeably to describe a dispensing unit.
Display blanking	Function turns all displays “ON” or “OFF” on a side of the dispenser. If the displays are blank, then a transaction is not allowed.
DLT	Display Last Transaction
EC	Error Code - a number that identifies an error condition reported by the software
Five Button Preset	This is a keypad that contains five buttons using which the customer can enter a pre-determined value and/or increment or decrement the selected sale or volume value prior to fueling.
Firmware	Basic unit/component operational instructions contained and sold on a hardware electronic chip.
Function Code	One or more procedures within a Command Code
Grade	Indicates the fuel grade available at the nozzle. In case of blender dispensers, a grade is created by blending products.
LCD	Liquid Crystal Display
LSD	Least Significant Digit
Manager Keypad	A device where programming and access of other unit information such as totals can be accessed.
Money Display	A six digit display that during normal operation, shows the total value of the fuel dispensed.
MSD	Most Significant Digit
Option Code	A choice that is available upon entering a Function Code
PIN	Personal Identification Number is a Security PIN Code used to access the programming.
PPP	Programmable Pump Preset. This option is used to set up specific volume of fuel or dollar amounts to be dispensed using specific key pad buttons.
PPU Display	Display that contains the Price Per Unit (PPU) of the associated grade

Term	Definition
Product	Indicates the base fuel grade available in the storage tank. Not to be confused with “Grade”. However, in a non-blending environment, a grade is the same as a product.
Prover (can)	A calibrated can used by Weights and Measures officials and calibrating technicians to accurately check or calibrate meters in a fuel dispenser.
Software	Basic unit/component operational instructions downloaded from a laptop or other source and stored within the dispenser.
Side 1	Indicates the electrical access side of the dispenser. The Manager Keypad is accessed from Side 1 of the dispenser.
Volume Display	A six-digit display that during normal operation shows the total volume of product dispensed.
VUT	Volume Unit Type (Liters or US gallons)
Warm Start	Accomplished by powering down the dispenser, and repowering and exiting programming modes. Resets the unit processors.

Programming Mode

Dispenser programming mode can only be entered when both sides of dispenser are in an idle mode. Nozzles must be in nozzle boots and no grade select buttons can be pressed. Dispenser programming results in unit being placed offline with regard to external communications. To start programming the dispenser, press **F1** on the Manager Keypad. The following sub-sections describe general dispenser operation while in the programming mode.

Programming Levels

There are three basic programming levels associated with the Encore 300 and four programming levels with Encore 5XX units and Eclipse.

For Encore 5XX, entry into a security level allows use of all the programming features within that security level and below. For Encore 300, entry into a security level allows use of all of the programming features within that security level and not below. Thus, if the configuration Level 4 Security PIN Code is entered, all configuration, Level 3, Level 2, and Level 1 Command Codes are allowed.

⚠ WARNING

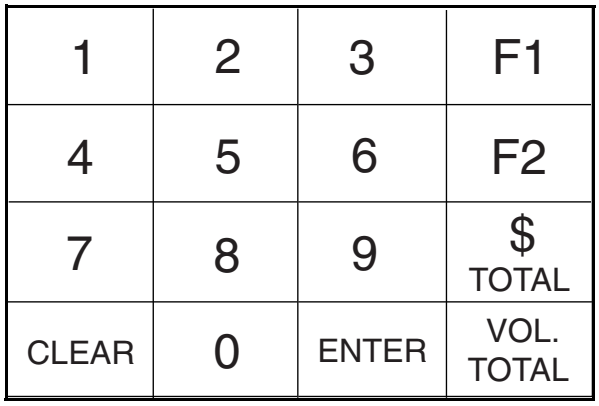
Surfaces of Eclipse Series units are non-metallic. Magnetic-backed keypads will not adhere to Eclipse unit surfaces as they will to others. In any situation where power is on and gasoline and its vapors are present or potentially present (for example, calibration), do not attempt to use the Manager Keypad with electronics cabinet open.

Fuel and its vapors may ignite, leading to serious injury or death.

For Eclipse units, run keypad cable over door and close door, allowing keypad to be suspended on unit and accessed from outside, for all procedures performed with power applied or where there is a possibility of fuel or fuel vapor being present.

Manager Keypad Layout

Figure 5-1: Manager Keypad Layout



Manager Keypad Key Definitions and Use

Key(s)	Definition/Use
0-9	Numeric Values
F1	Function 1 – Used to start dispenser programming and sequence among programming and Function Codes. In general, pressing **F1,** will take user back to a previous programming function selection. Pressing **F1** from the normal dispenser state will always initiate programming mode. *Note: Displays are always activated during programming mode.*
F2	Function 2 – Used to exit programming mode and return to normal mode. A unit warm start also occurs after pressing **F2** while in the programming mode.
$Totals	Money Totals – Used to display money totals by side and grade. This key does not require a Security PIN Code. CLEAR key is used to exit money totals mode.
Vol. Total	Volume Totals – Used to display volume totals by side and grade. This key does not require a Security PIN Code. CLEAR key is used to exit volume totals mode.
ENTER	Value entry keys – sends the entered value to pump. *Note: If you do not press **ENTER** during programming, that particular programming step will not be saved.*
CLEAR	CLEAR key – Used to clear last keypad entry, and exit money and volume total mode.

Display Conventions

Programming Convention

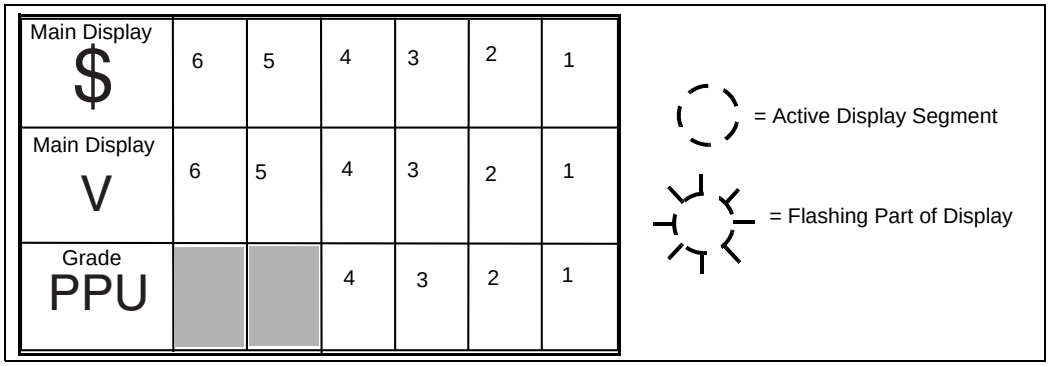
The programming digit positions for main money and volume displays are shown in the Figure 5-2 on page 5-5. This applies even to cases where more than six display digits are available for display. Information is displayed on all grade PPUs when necessary, and restricted to digits “4” through “1”, unless otherwise noted.

Note: PPUs depending upon the vintage of the unit may not be found in the main display.

Figure 5-2: Programming Digit Positions for Main Money and Volume Displays

Main Display $	6	5	4	3	2	1
Main Display V	6	5	4	3	2	1
Grade PPU			4	3	2	1

Figure 5-3: Programming Digit Positions on Displays



During programming, Command Code is always shown left justified in the main money display, starting at digit position “6”. Other display information is dependent upon specific programming Command Codes and Function Codes within the Command Code.

The flashing field on the LCD display is shown in large bold italic font (example: ***2***).

Programming parameters are shown in LCD displays as soon as parameter selection key is pressed. Selected parameters continue flashing until either **ENTER** or **F2** is pressed. Parameters are entered into the memory only after **ENTER** is pressed.

Locating Specific Programming Information

Specific programming information related to product series begins on the following pages.

For Information on	Go to	Page
Encore 300 Series	Encore 300 Programming Pump/Dispenser	5-8
Encore 5XX and Eclipse Series	Programming Encore 5XX and Eclipse Series Units	5-39

Firmware/Software Versions

Encore 300 Firmware Versions

Unit Type	With Digital Valves	With Proportional Valves
MPD/Dual/Quad	V20.X.X	V10.X.X
Single Hose MPD	V22.X.X	V12.X.X
Single Blender	V25.X.X	V15.X.X
Multi (6) Blender	V27.X.X	V17.X.X
ATC Option (ATC Controller)	V30.X.X	V30.X.X

Encore 5XX Firmware Versions

Unit Type	Version
All	V1.8.00

Programming Errors

If data entered (Command Code, Function Code, Parameter) is invalid, data field will go blank for 2 seconds and a double beep will sound. After 2 seconds, Error Code 20 will be displayed.

General Programming Operation

On pressing **F1**, dispenser will go offline and all main display LCDs will blank out and money display will show 8888. To begin programming, you will need to enter a four-digit Security PIN Code for the required security level. As each digit of Security PIN Code is entered, a dash (-) will be displayed on main money display for that digit. Once all security digits are entered, press and release **ENTER**. If Security PIN Code is accepted, main money display will change to flashing 0000. Else, money display will show flashing 8888 to indicate an invalid Security PIN Code.
Note: To begin programming, you must enter the four-digit Security PIN Code.

If a valid Security PIN Code is entered, user may then enter Command Code and proceed with dispenser programming as described in the sections that follow. If an invalid Security PIN Code is entered, user simply re-keys the code and presses **ENTER** again. Else, user may press **F2** to exit programming mode.

Upon valid Security PIN Code entry, display will show 0000 until first digit of a Command Code is entered. Upon entry of first digit, display will blank out, showing entered digit as flashing and left justified to position 6. As each new digit is entered, digits flash and follow in positions 5, 4, and so on. When a complete Command Code is entered, it will flash until **ENTER** is pressed.

Once a programming Command Code is activated, the default or first selectable entry for that mode will be shown as flashing. Defaults and further keypad entries will show as flashing digits and will update display as they are keyed in. This action continues until **ENTER** is pressed. Once you press **ENTER** the next programming field will start flashing, indicating an operator action is required. This keypad/display functionality will continue until you exit the programming mode.

Notes:1) It is important to note that each programming level utilizes a Security PIN Code as shown in the following table. Function Codes within a Command Code begin at 1.

2) Entering the highest level Security PIN Code for Encore 5XX and Eclipse series units will grant you access to all lower level Security PIN Codes.

Entry into a Command Code will present data as the default value or last programmed values for that Command Code. Only one Command Code and Function Code/Parameter may be programmed/changed at a time.

The following table shows currently allocated Security and Command Codes that have been assigned for use in Encore and Eclipse. These PIN Codes can be programmer modified as described later.

Note: For maximum station security, Gilbarco recommends default Security PIN Codes be reprogrammed to the non-default Codes.

Programming Level	Default Security PIN Code	E300 Command Code Range	E5XX Command Code Range
Level 1	2222	1-9	20-39
Level 2	1503	10-12	40-69
Level 3	1309	13-17	70-89
Level 4*	0128	N/A	90-109
* Only on Encore 5XX and Eclipse			

Sub-sections that follow describe programming commands for each programming level.

Important Information about Using V1.7.58 and Higher for Encore 5XX and Eclipse Dispensing Pump Software

As the calibration mode is automatically entered when the Weights and Measures switch is toggled for these versions of software, to program Level 3 and 4 commands (70 and higher), a different approach must be used. Earlier, it was possible to toggle the Weights and Measures switch prior to entering the programming mode. Now, you must be in Level 3 or 4 prior to toggling the switch. Follow instructions provided at the beginning of Level 3 and Level 4 programming for this version of software.

The calibration procedure assumes that either a 5 gallon or 20 liter prover can will be used. If another size can is used, you must change the default can size in Command Code 82. As the new can size will be stored in memory for future calibrations, if the special can size is not likely to be used for the next calibration, it is very important to reprogram the can size back to default after completing the calibration. It is also wise to verify the can size on the money display during calibration.

Error Code 26 will not clear automatically after a unit has been first calibrated. A warm start is now required. This will be primarily noted after installing a new service board and calibrating or performing a true cold start (drop back to V1.3.74 Pump Node software and then reload to the current version) where re-calibration is required.

When performing the combined verification test and re-calibration, electronic and electro-mechanical totals will increase as during a normal sale.

Encore 300 Programming Pump/Dispenser

Contents in this Sub-Section

Description	Page
Encore 300 Programming Pump/Dispenser	5-8
Encore 300 Programming Quick Reference	5-9
Encore 300 Programming and Data Access Instructions	5-10
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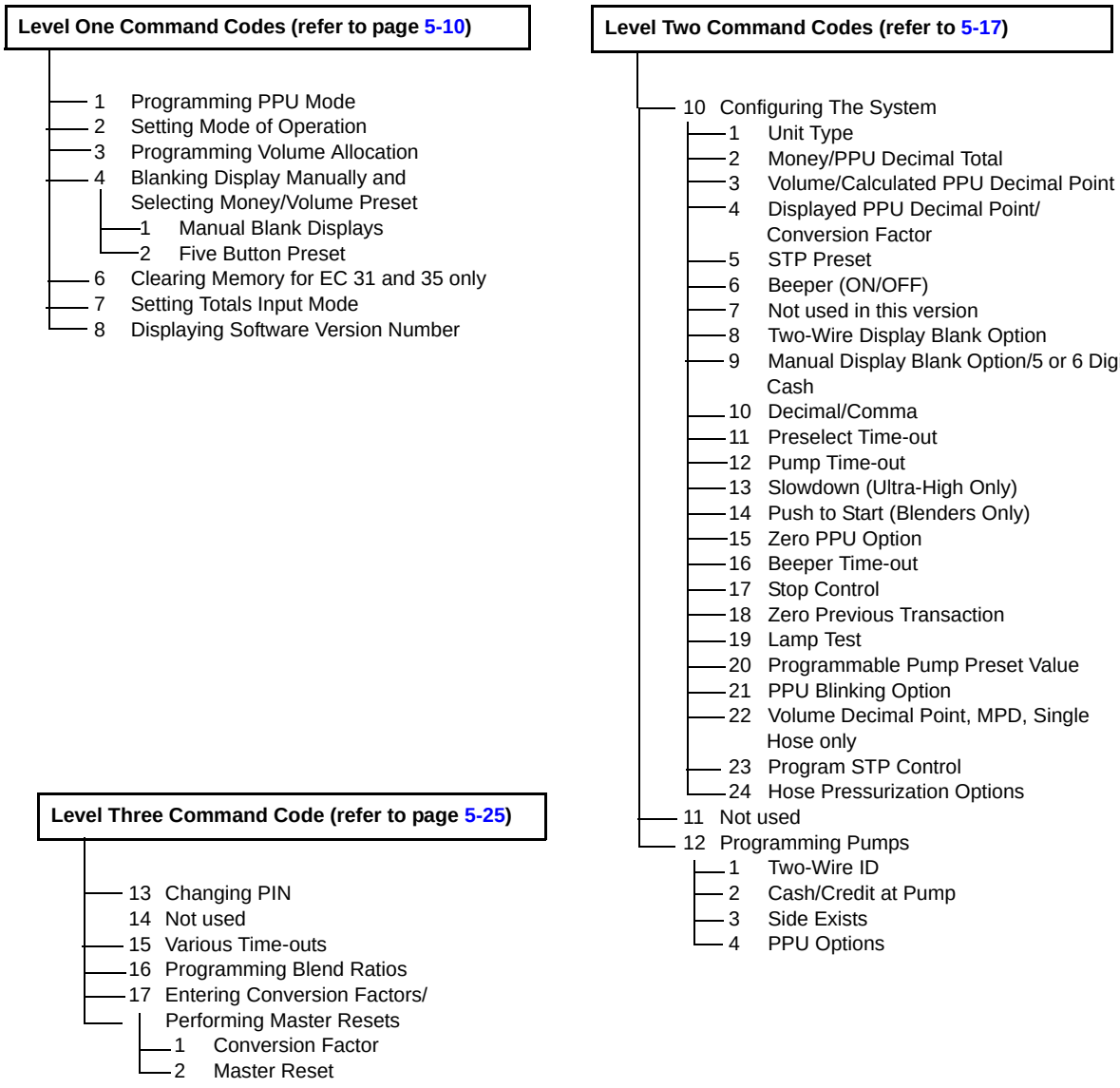
Additional Manager Functions for Encore 300	5-30

Encore 300 Programming Quick Reference

Command Codes and Function Codes Quick Reference Chart

The following chart shows Command Codes and Function Codes for different levels. Refer to the following pages for more details.


Level One Command Codes (refer to page 5-10)
1 Programming PPU Mode
2 Setting Mode of Operation
3 Programming Volume Allocation
4 Blanking Display Manually and Selecting Money/Volume Preset
1 Manual Blank Displays
2 Five Button Preset
6 Clearing Memory for EC 31 and 35 only
7 Setting Totals Input Mode
8 Displaying Software Version Number
Level Two Command Codes (refer to 5-17)
10 Configuring The System
1 Unit Type
2 Money/PPU Decimal Total
3 Volume/Calculated PPU Decimal Point
4 Displayed PPU Decimal Point/ Conversion Factor
5 STP Preset
6 Beeper (ON/OFF)
7 Not used in this version
8 Two-Wire Display Blank Option
9 Manual Display Blank Option/5 or 6 Digit Cash
10 Decimal/Comma
11 Preselect Time-out
12 Pump Time-out
13 Slowdown (Ultra-High Only)
14 Push to Start (Blenders Only)
15 Zero PPU Option
16 Beeper Time-out
17 Stop Control
18 Zero Previous Transaction
19 Lamp Test
20 Programmable Pump Preset Value
21 PPU Blinking Option
22 Volume Decimal Point, MPD, Single Hose only
23 Program STP Control
24 Hose Pressurization Options
11 Not used
12 Programming Pumps
1 Two-Wire ID
2 Cash/Credit at Pump
3 Side Exists
4 PPU Options
Level Three Command Code (refer to page 5-25)
13 Changing PIN
14 Not used
15 Various Time-outs
16 Programming Blend Ratios
17 Entering Conversion Factors/ Performing Master Resets
1 Conversion Factor
2 Master Reset

Encore 300 Programming and Data Access Instructions

This section contains information and steps to program the Encore 300 dispenser/pump. Certain programming levels will also allow you to view dispenser/pump data.

Note: For a simplified listing of functions and settings, refer to MDE-4039 Encore 300 Programming Quick Reference Guide.

Level One Command Codes

To access Level One Command Codes, proceed as follows:

1 Press **F1** on Manager Keypad.

2 Enter your PIN (default 2222).

To access a different Level One Command Code (from any Command Code), proceed as follows:

1 Press **F1** on Manager Keypad.

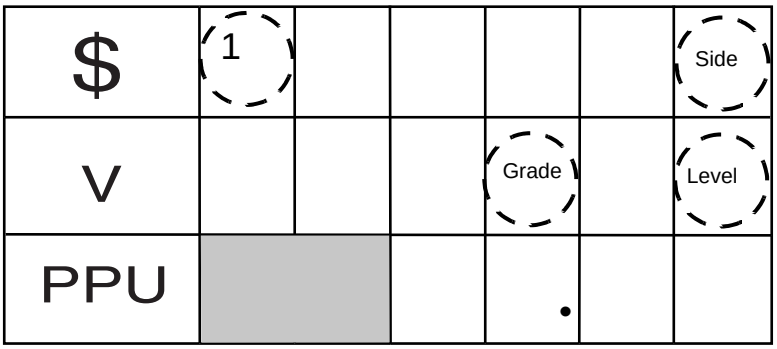
2 Enter the **Command Code** number to access.

3 Press **ENTER**.

Command Code 1: Programming PPU Mode

Program the Price Per Unit (PPU) for each side, grade, and price level (cash/credit).

Figure 5-4: Programming PPU Mode



1 Press **1**, then press **ENTER** on Manager Keypad to access this Command Code.

2 Select Side, then press **ENTER**.

To Select Side	Press Configuration
Side 1 (side with junction box)	1
Side 2	2
Both sides	3

3 Select grade, then press **ENTER**. Price level number flashes.
Note: The number of hoses/grades vary for each model.

Dispenser Type	Grade Numbers
MPD	1,2,3
MPD 4	Not available
Quad	1,2
Dual 1: 6 Blender	1,2,3
3+0 blender	1,2,3
5+0 blender	1,2,3,4,5
3+1 blender	1,2,3,6

4 Select Price Level, then press **ENTER**. The PPU flashes.

To Select	Press Configuration
Cash price levels	1
Credit price levels	2

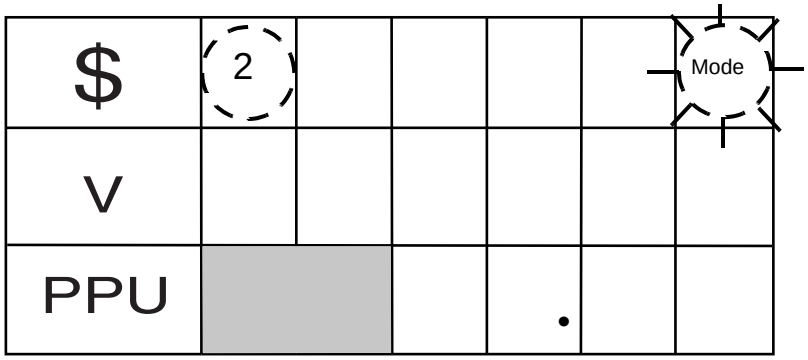
5 Enter new PPU. Start with MSD (for example: 1.259; press 1,2,5,9). Press **ENTER**.

6 Repeat steps 2 through 6 to program all sides, grades and price levels.

Command Code 2: Program Two Wire/Standalone

Choose mode of operation: two-wire for console control or standalone for non-console control for your pump/dispenser.

Figure 5-5: Program Two Wire/Standalone



1 Press **2**, then **ENTER** on Manager Keypad to access this Command Code.

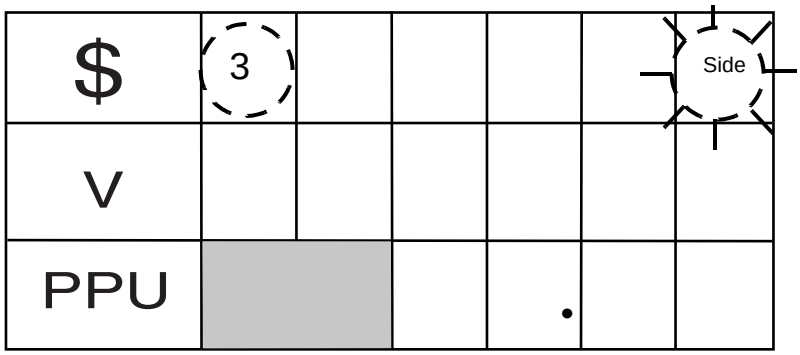
2 Select Mode, then press **ENTER**.

To Select Mode	Press Configuration
Standalone (without console control)	0
Two-wire operation (with console control) *Note: This is the default.*	1

Command Code 3: Programming Volume Allocation

Set a maximum limit on fuel volume pumped per customer.

Figure 5-6: Programming Volume Allocation



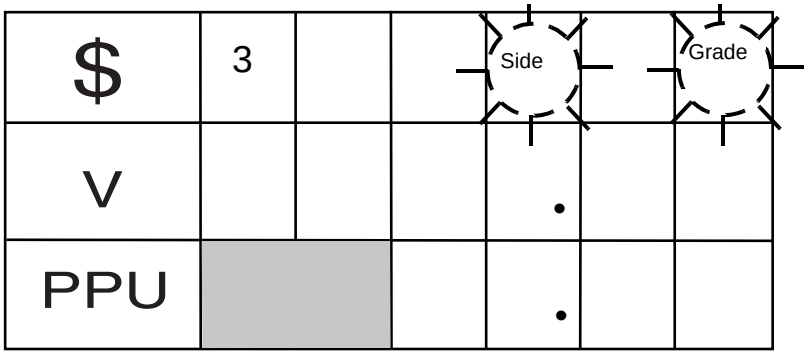
1 Press **3**, then **ENTER** on Manager Keypad to access this Command Code.

2 Select Side, then press **ENTER**.

To Select	Press Configuration
Side 1 (side with junction box)	1
Side 2	2
Both sides	3

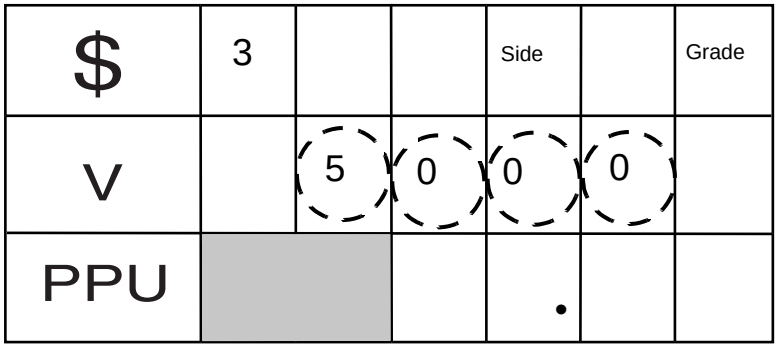
3 Select Grade, then press **ENTER**.
Note: The number of grades vary for each model.

Figure 5-7: Grade Selection Screen



4 Enter volume allocation amount. Start with MSD. For example, to enter 500 gallons, press **5**, then **0**. The default is 000.0 (no allocation limit). You cannot enter the hundredths digit.

Figure 5-8: Volume Allocation Display



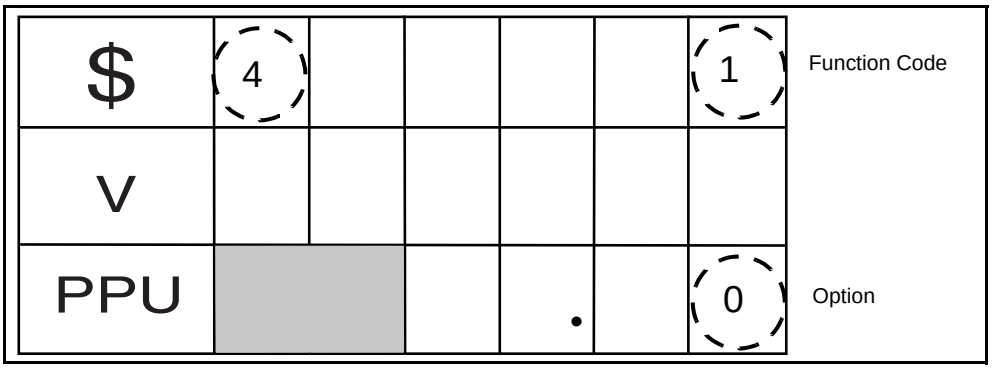
5 Press **ENTER**. Side number flashes.

6 Repeat steps 1 to 5 to program all sides, grades and price levels.

Blanking Display Manually and Selecting Five Button Money (Cash/ Volume) Preset: Command Code 4

This manual blank function is typically used for standalone units to blank out the displays when the station is closed but the power is not removed from the dispenser/pump.

Figure 5-9: Blanking Display



1 Press **4**, then **ENTER** on Manager Keypad to access this Command Code.

2 Select Function Code 1 or 2, then press **ENTER**.

Function Code 1: Manual Blank Displays

To Select This Option	Press Configuration
Displays OFF	0
Displays on (Default)	1

Function Code 2: Five Button Preset

To Select This Option	Press Configuration
No Five Button Preset * (Default)	0
Money Preset	1
Volume Preset	2
Incremental Presets	3

* If Programmable Pump Preset is present, unit cannot be programmed to Five Button Operation.

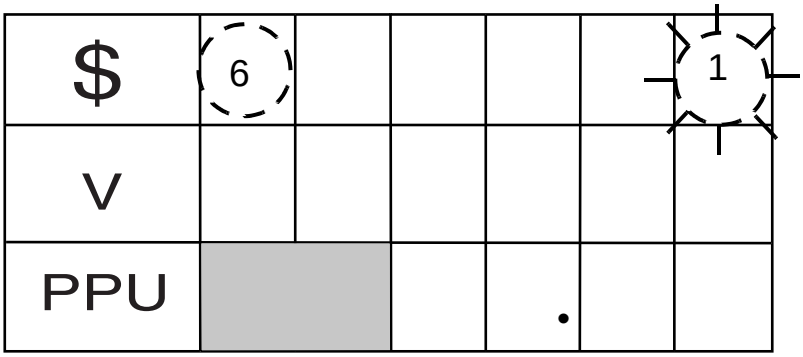
Note: Command Code 10, Function Code 8 on page 5-20 can also be used to blank out displays from the console.

Command Code 6: Clearing Memory

Perform a Totals Memory Clear. Record all totals before reset. After performing a totals memory clear, a master reset Command Code 17, Function Code 2, should also be completed.

Note: A totals memory clear works only if Error Code 31 (Totals Data Error) or 35 (Configuration Data Error) occurs.

Figure 5-10: Clearing Memory



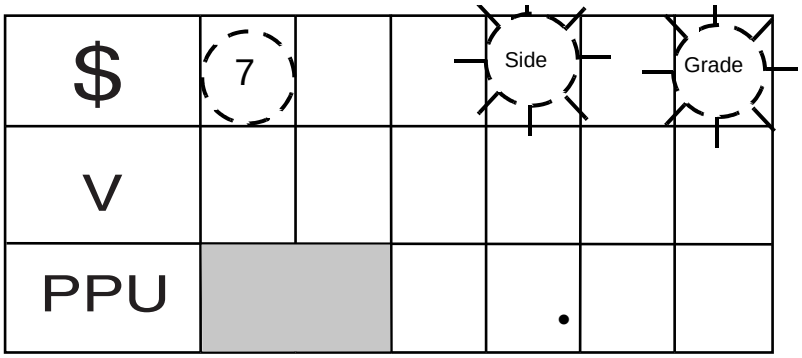
1 Press **6**, then **ENTER** to access this Command Code.

2 Press **1**, then **ENTER**. System performs power-up reset and continues in normal operation. You must reprogram the unit.

Command Code 7: Setting Totals Input Mode

Money total appears when Totals Input Mode is entered. Press **VOL TOTAL** to enter volume totals. Press **$TOTAL** to change back to money total.

Figure 5-11: Setting Totals Input Mode



Command Code 7 is active only after clearing memory (see "Command Code 6: Clearing Memory" on page 5-14), performing a master reset, or during an install.

1. Press **7**, then **ENTER** on Manager Keypad to access this Command Code.

2. Select side, then press **ENTER**.

To Select	Press Configuration
Side A (side with junction box)	1
Side B	2

3. Select grade, then press **ENTER**.
   Note: For Blenders, grade 7 = high product, and grade 8 = low product.

4. Enter total starting with MSD. Press **ENTER**.

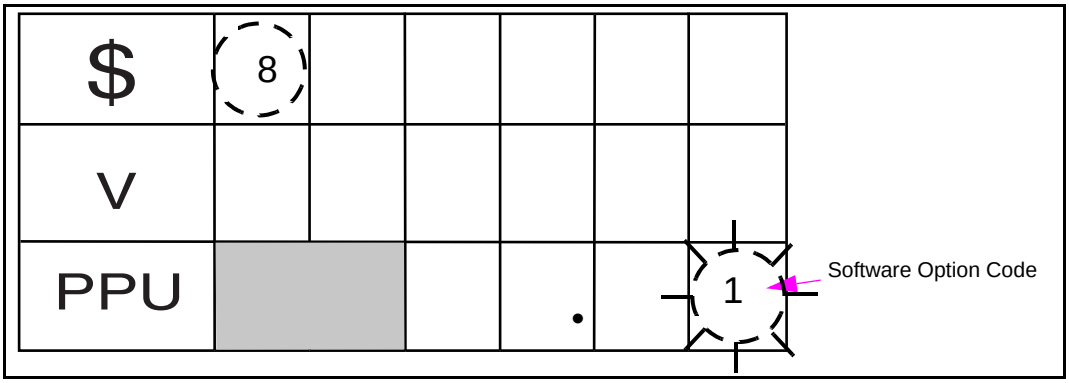
5. Repeat Steps 1 to 4 for each side and grade.

6. Press **VOL TOTAL** on Manager Keypad and repeat steps 3 to 5 for volume totals.

Command Code 8: Displaying Software Version

Display software version installed in dispenser. Version number appears on volume display.

Figure 5-12: Displaying Software Version



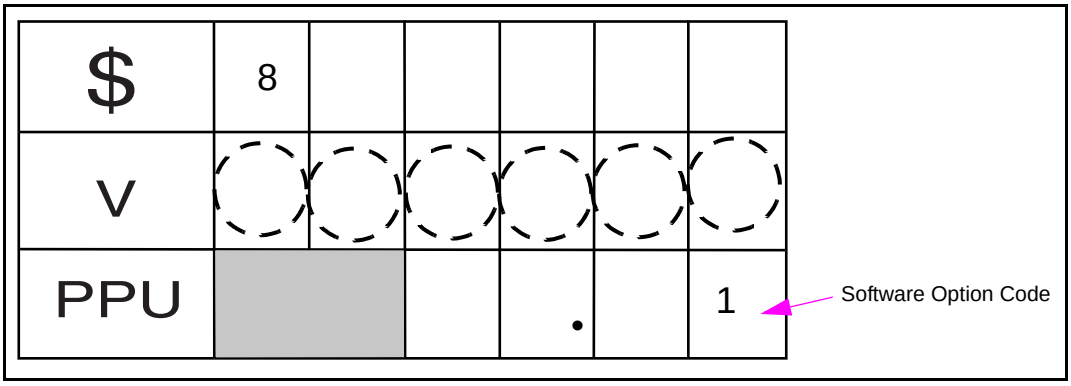
1 Press **8**, then **ENTER** to access this Command Code.

2 Select software option.

To Select	Press Configuration
Pump Controller	1
Hydraulic Interface	2
Customer Programmable Preset	3

3 Software version is displayed in the Volume Display.

Figure 5-13: Volume Display



Level Two Command Codes

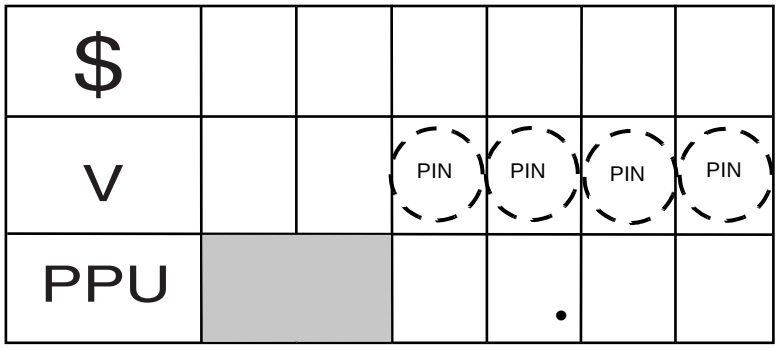
Do not allow station owners to program these Service Command Codes. Before programming, make a note of your unit's model number and software version. See "Command Code 8: Displaying Software Version" on page 5-16.

Note: ASCs are required to use this programming information during the start-up procedure.

To access Level Two Command Codes:

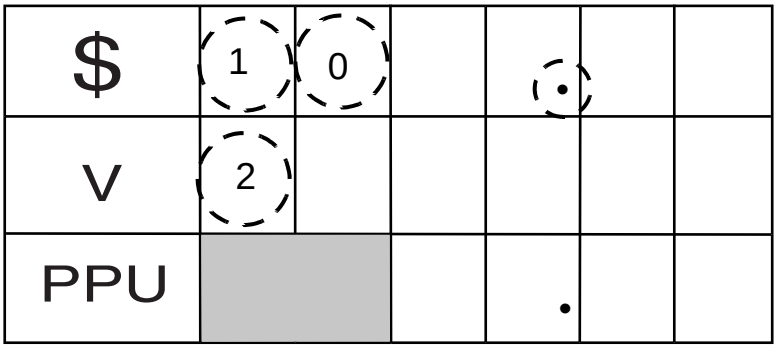
1 Press **F1** on Manager Keypad, enter the **Level 1 PIN Code**, then press **ENTER**.

Figure 5-14: Level 1 PIN Code on Manager Keypad



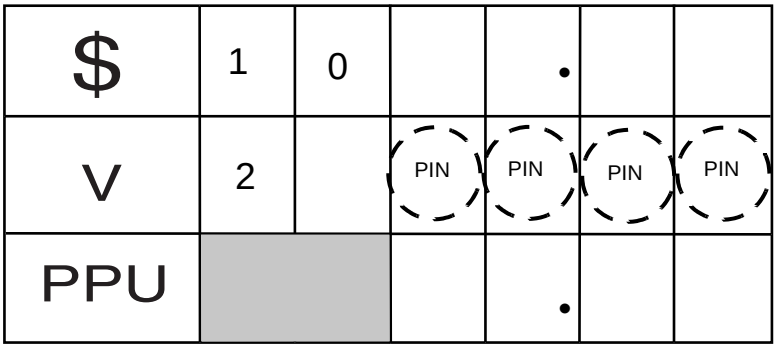
2 Enter a Level 2 **Command Code** (**10-12**), then press **ENTER**. A decimal point appears in the money display and a **2** appears in the volume display.

Figure 5-15: Money Display



3 Enter your **Level 2 PIN Code** (Default 1503), then press **ENTER**.

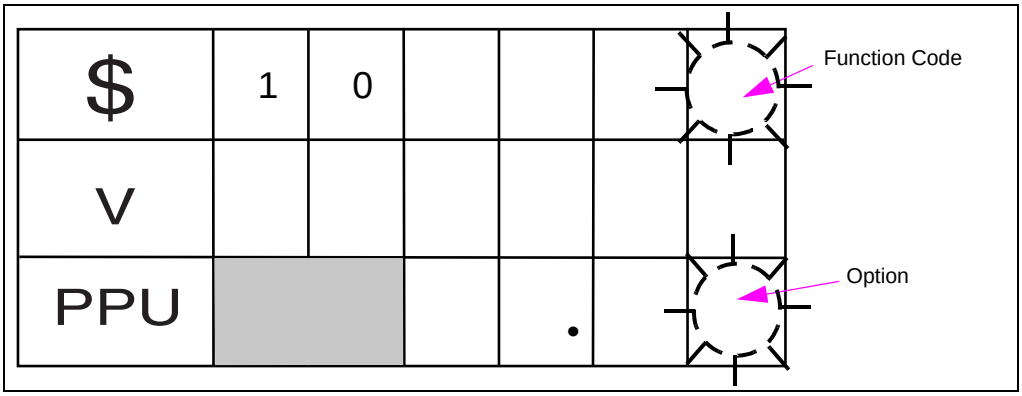
Figure 5-16: Level 2 PIN Code



Command Code 10: Configuring the System

Note: Settings affect both fueling positions.

Figure 5-17: Configuring the System



1 Press **1**, then **0**, then **ENTER** on Manager Keypad to access this Command Code.

2 Enter a **Function Code number** (1 to 24), then press **ENTER**.

3 Enter a Configuration Code, then press **ENTER**.

4 Choose another Function Code number or press **F2** to exit.

Function Code 1: Unit Type

It is recommended to leave these settings at the system defaults.

For This Unit Type	Press Configuration
1 Product	1
2 Products	2
3 Products	3

Function Code 2: Money Decimal Point

For This Money Decimal Point	Press Configuration
XXXXX.	1
XXXX.X	2
XXX.XX (Default)	3
XXX.XXX	4

Function Code 3: Calculation PPU Decimal Point

U.S. Weights and Measures requires Configuration Code 4.

For This Calculation PPU Decimal Point	Press Configuration
XXXXX.	1
XXX.X	2
XX.XX	3
X.XXX (Default)	4

Function Code 4: Displayed PPU Decimal Point

Use this Function Code when you calculate the PPU in dollars but display the decimal point in cents (for example, for Canada). You must program Function Code 3 before Function Code 4 if the displayed decimal point is different from the calculation decimal point.

For This Displayed PPU Decimal Point	Press Configuration
N/A	0
XXXX	1
XXX.X	2
XX.XX	3
X.XXX (Default)	4

Function Code 5: STP Prestart

Use this function to program the STP to turn on after pump handle activation. Turn this function “ON” for mechanical line leak detectors, or “OFF” for most electrical line leak detectors.

To Program the STP	Press Configuration
Off	0
On (Default) with pump handle activation	1

Function Code 6: Beeper and VaporVac Alarm Option

Use this function to program the beeper to sound when you lift pump handles, authorize the dispenser, or press keypad switches. The VaporVac alarm beeps until warm start occurs.

To Program the Beeper	And the VaporVac Alarm	Press Configuration
Off (Default)	Off	0
On	Off	1
Off	On *	2*
On	On *	3*

** VaporVac alarm must be set to “ON” for units in Mexico.*

Function Code 7: Vapor Sense Option

Automatically set to "ON" for units with VaporVac option.

To Program the Vapor Sense Option	Press Configuration
Off (Default)	0
On	1

Function Code 8: Two-wire Display Blank Option

Use this function to blank the displays and disable the dispenser using the console. You must perform a $980.00 preset post pay at the console to blank the displays and a $981.00 preset post pay to turn them back on. Also see Command Code 4, Function Code 1 on page 5-13 for details on how to manually blank-out displays at the dispenser/pump.

Note: Dispenser backlights remain on after digits are blanked out. Pumps and dispensers cannot be used when displays are blanked since handles and grade select button are disabled.

To Program The Two-Wire Blank Option	Press Configuration
Off (Default)	0
On	1

Function Code 9: 5 or 6 Digit Cash

Use this function to program five or six digits of cash. You must program control console/cash register to same mode for proper operation.

To Program The Digits of Cash	Press Configuration
5 Digits of cash (Default)	0
6 Digits of cash	1

Function Code 10: Decimal/Comma

Use this function to set commas instead of decimals for all displays.

To Program The Decimal/Comma	Press Configuration
Decimal (Default)	0
Comma	1

Function Code 12: Pump Time-out

Pump Time-out sets the maximum continuous amount of time after starting the fueling that a customer can halt fuel delivery before the sale is terminated. This function can be used as a security feature to monitor tampering with the unit. Setting to too small a time leads to customer inconvenience.

For This Time-Out	Press Configuration
None (Default)	0
5 seconds	1
15 seconds	2
30 seconds	3
45 seconds	4
60 seconds	5
75 seconds	6
90 seconds	7
120 seconds	8

Function Code 13: Slowdown (Ultra-Hi™ units only)

Models NP0, NP3, NP4 and NP5

Note: This programming mode or Command Code 13, Function Code 4 can be used by Ultra-Hi models. The last Function Code programmed will be used by the unit regardless of the setting of the other code.

Program the point at which the dispenser goes into slowdown on all non-blenders. Not all software version offers all of the selections noted here. Normally, stations not offering prepays can be set at minimum times. Higher values can be selected if preset targets are not hit consistently. Select three preset sales minimums at the setting to allow the dispenser to "learn" the new value before drawing conclusions regarding a setting's ability to correct the preset problem.

For This Slowdown	Press Configuration
.070 gallons (.265 liters)	0
.120 gallons (.454 liters) (Default)	1
.170 gallons (.643 liters)	2
.220 gallons (.833 liters)	3
.270 gallons (1.02 liters)	4
.320 gallons (1.21 liters)	5
.370 gallons (1.40 liters)	6
.420 gallons (1.59 liters)	7
.470 gallons (1.78 liters)	8
.520 gallons (1.97 liters)	9

Function Code 14: Push to Start for G6 (+1 of 3+1 blender only)

When Grade 6 (3+1 blender) programming has been enabled, the G6 (+1) grade selection button must be pressed before fuel can be delivered for G6.

To Program Zero PPU Pricing	Press Configuration
Disabled/not installed	0
Enabled	1

Function Code 15: Zero PPU Pricing

Allows fuel dispensing with a PPU of zero (fleet operations only)

To Program Zero PPU Pricing	Press Configuration
Disabled (Default)	0
Enabled	1

Function Code 16: Beeper Time-out

Use with Function Code 12 to give an audible signal after pump time-out. After pump time-out, the beeper beeps for the programmed seconds, then deactivates the dispensing unit with Error Code 29. Error Code 29 is dismissed by returning the nozzle to the nozzle boot.

Beeper Time-out	Press Configuration
None (Default)	0
5 seconds	1
15 seconds	2
30 seconds	3
45 seconds	4
60 seconds	5

Beeper Time-out	Press Configuration
75 seconds	6
90 seconds	7
120 seconds	8

Function Code 17: Stop Control

Deactivates one or both sides of a dispenser when optional Push To Stop Button is pressed.

To Program STOP Control	Press Configuration
For one side (Default)	0
For two sides	1

Function Code 18: Zero Previous Transaction

Programs the dispenser to reset to zero the transaction displayed after:

- the pump handle is activated (raised) and unit is authorized.
- no fuel is dispensed.
- the handle is deactivated (lowered).

Normally, the previous sale would be shown.You must use Configuration Code 1 for New Jersey installs.

To Zero Previous Transactions	Press Configuration
After lamp test (Default)	0
Before lamp test	1

Function Code 19: Lamp Test (Leak Detector Test Setup)

Sets in seconds the amount of time the display shows all “8”s during the reset cycle at the beginning of a transaction. This time is typically set to allow for the STP mechanical leak detectors to run a complete test. For electronic line leak detectors, normally this is set to “OFF”. However, follow the recommendations of line leak detector manufacturer to set time (not an actual test of lamps).

To Perform	Press Configuration
Not used	0
One second lamp test	1
Two second lamp test	2
Three second lamp test (Default)	3
Four second lamp test	4
Five second lamp test	5
Six second lamp test	6
Seven second lamp test	7
Eight second lamp test	8
Nine second lamp test	9

Function Code 20: Programmable Pump Preset Value

Normally set to “0”. Program to “1” for use with 6-digit cash programming.

To Set Programmable Pump Preset Value	Press Configuration
X1 (Default)	0
X10	1

Function Code 21: PPU Blinking Option

Program the PPU displays in the price bar to blink under certain conditions.

To Set PPU Blinking	Press Configuration
Off	0
On (Default)	1

Function Code 22: Volume Display Decimal Point

Use this function to program the decimal point out of the main volume display. When programmed to "1", the decimal point is not shown on the display. Function Code 22 is not approved by U.S. Weights and Measures.

To Set Volume Display	Press Configuration
XXX.XXX (Default)	0
XXXX.XX (Export Only)	1

Note: If set to "1", decimal point will not show. The decimal point shown in the table is for reference only.

Function Code 23: Program STP Control

Use this function to activate all STPs on all transactions (regardless of which grade is selected). Use this Code for Encore MPD single-hose units only (NG0, NG2, NG4 or NG5) .

To Set STP Control	Press Configuration
Off (Default)	0
On	1

Function Code 24: Hose Pressurization Option

Use this function to pressurize the hose during lamp tests of the first transaction after a power up or the first transaction after a period of inactivity.

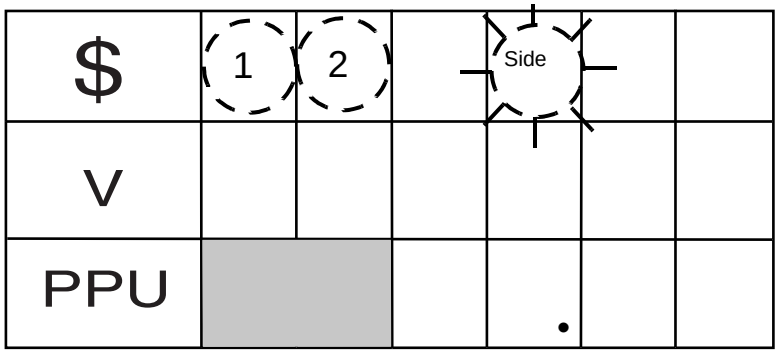
Note: This function should not be used to correct situations with leaky check valves, nozzles or vapor recovery hoses. This programming feature can be useful to correct minor leaks from the meter back towards the tank which cause calibration issues, fuel delivery indication when the fueling position is activated with the nozzle is closed, and so on. Recent US Weights and Measures requirements require that configuration #1 and later firmware versions not be programmed differently.

To Set Hose Pressurization Option	Press Configuration
Off (Default)	0
On, up to 10 minutes	1
On, up to 30 minutes	2

Command Code 12: Programming Pump/Dispenser ID and Certain Configurations

Program the pump as follows. Each fueling position side must be programmed.

Figure 5-18: Programming Pump/Dispenser ID



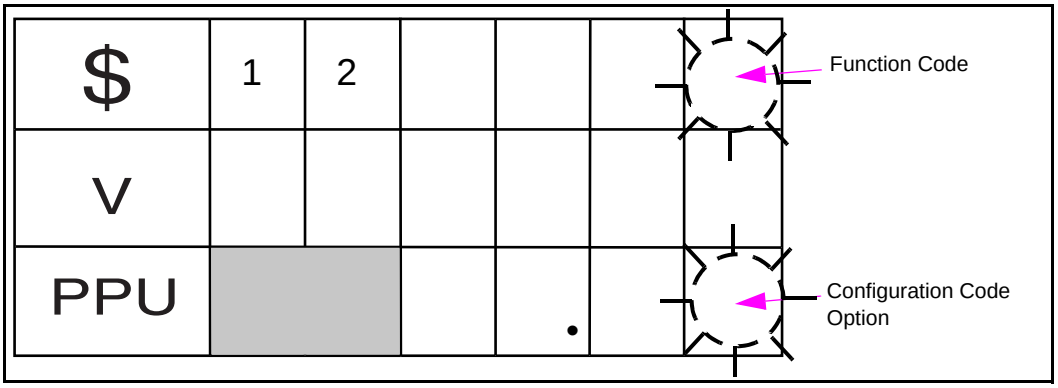
1 Press **1**, **2**, then **ENTER** to access this Command Code.

2 Select Side, then press **ENTER**.

To Select	Press Configuration
Side 1 (A) (side with junction box)	1
Side 2 (B)	2

3 Enter a Function Code number (**1-5**), then press **ENTER**.

Figure 5-19: Entering Function Code numbers



4 Enter a Configuration Code Option, then press **ENTER**.

5 Choose another Function Code number or press **F2** to exit.

Function Code 1: Two-wire ID

Do not use the same ID (address) number for units (or unit sides) on the same data loop. Side "1" always defaults to 7, Side "2" always defaults to "11".

To assign a number **1-16**, press that number on the keypad and press **ENTER**.

Function Code 2: Cash/Credit at Pump
When programmed to "Yes," the customer must select Cash or Credit at the unit. This Function Code should always be set at "0" for the Encore 300.

Function Code 3: Side Exists
Use this option to disable unused side of single-sided units only.

To Program	Press Configuration
Does not exist	0
Exists (Default)	1

Function Code 4: PPU Options
This option is used mainly with single level CRIND units and split island operation.

- If the unit has single-level PPU displays with switches (M02652A003) or without switches (M02652A004): The PPU will display the price regardless of the level sent from the console or CRIND.
- If the unit has dual-level PPU displays with switches (M02652A003) or without switches (M02265A008): The Level 2 (bottom) display is used for single level price posting when top display is covered.

To Program	Press Configuration
Level 1 price bar displays level sent by console or CRIND card reader	0
Normal (Default)	1
Level 2 price bar, Level 1 prices, Level 1, Level 2 prices	2
Level 2 price bar displays level sent by console or CRIND card reader (V70.6 and higher)	3

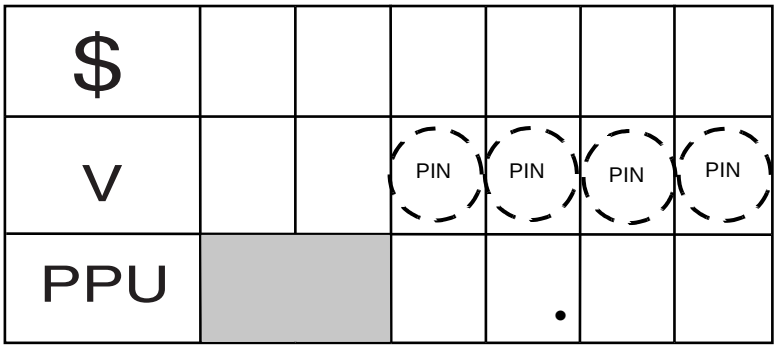
Function Code 5:
Not available in this version of software.

Level Three Command Code

To access Level Three Command Codes:

1 Press **F1** on Manager Keypad, enter the **Level 3 PIN Code**, then press **ENTER**.

Figure 5-20: Accessing Level Three Command Codes on Manager Keypad



Command Code 13: Changing PIN Code

Use the following procedure to change PIN Code for added security. Current PIN Code must be accessed before it can be changed. Revised PIN Codes enhance unit security. They must be securely stored by the station and the ASC.
Note: Do not allow station owners to program these Service Command Codes.

To access Level 3 Command Codes, proceed as follows:

1. Press **F1** on Manager Keypad, then enter the Level 1 PIN.
2. Enter a Level 2 Command Code (**10-12**), then press **ENTER**.
3. Enter the Level 2 PIN Code (**Default 1503**), then press **ENTER**.
4. Enter a Level 3 Command Code (**13 or higher**), then press **ENTER**.
5. Enter the Level 3 PIN Code (**Default 1309**), then press **ENTER**.

CAUTION

Carefully monitor keystroke activity for these steps. If you enter an incorrect PIN number (different than intended), a cold start, reprogramming, and re-calibration of the unit will be required.

Figure 5-21: Accessing Manager Keypad

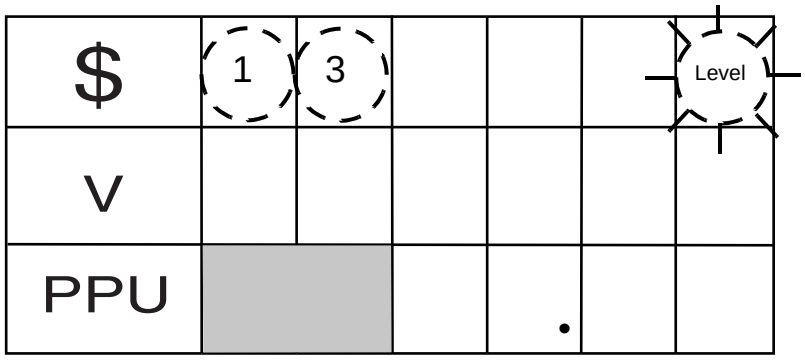
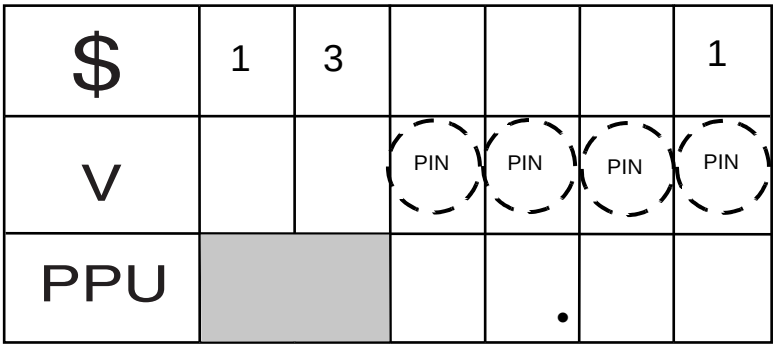


Figure 5-22: Changing PIN Code



Command Code 14

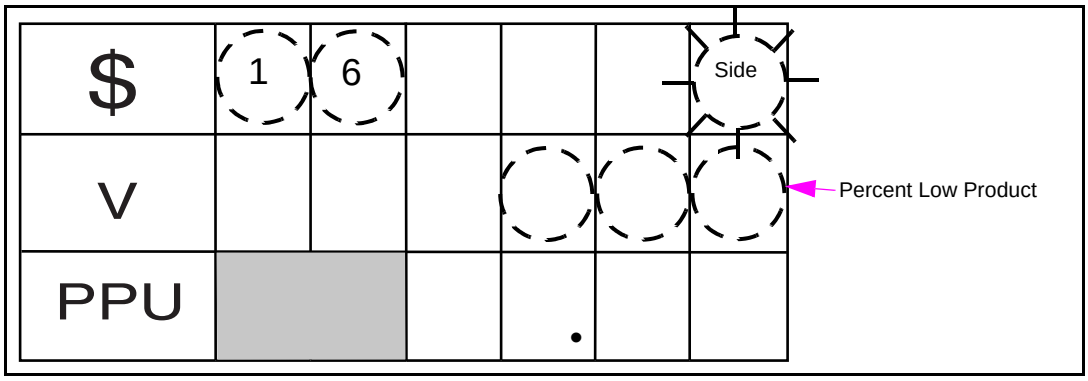
Do not use.

Command Code 15

Do not use.

Command Code 16: Programming Blend Ratios (Blenders Only)

Figure 5-23: Programming Blend Ratios



1 For Blenders only, press **1**, then **6**, then **ENTER** to access this Command Code.

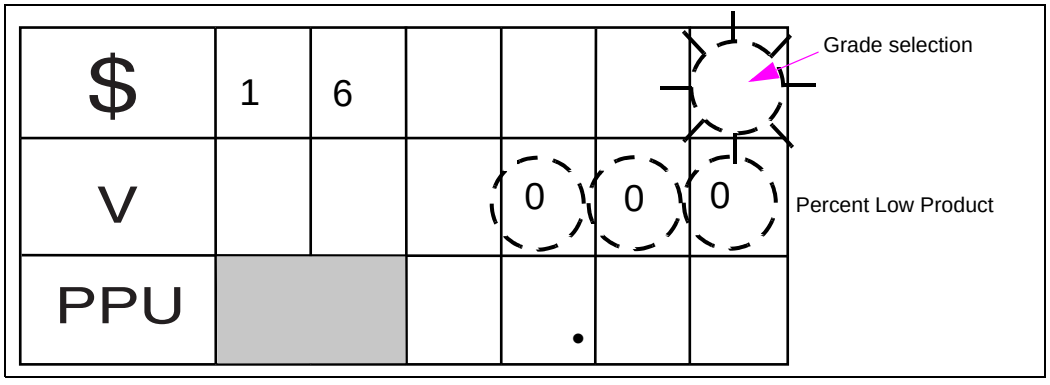
2 Select side number (**1-3**), then press **ENTER**.

To Program	Press Configuration
Side 1 (side with junction box)	1
Side 2	2
Both sides	3

Select Grade

1 Select grade number **1-5**, then press **ENTER**. The following table contains the required grade numbers for each model. Use the following table when programming grades.

Figure 5-24: Selecting the Grade Numbers



For These Models	Program These Grades
Dual	Grade 1
3 + 0	Grades 1, 2, and 3

For These Models	Program These Grades
5 + 0	Grades 1, 2, 3, 4, and 5
3 + 1	Grades 1, 2, 3, and 6
Six-Hose (Fixed) Blenders	Grade 1, 2, and 3

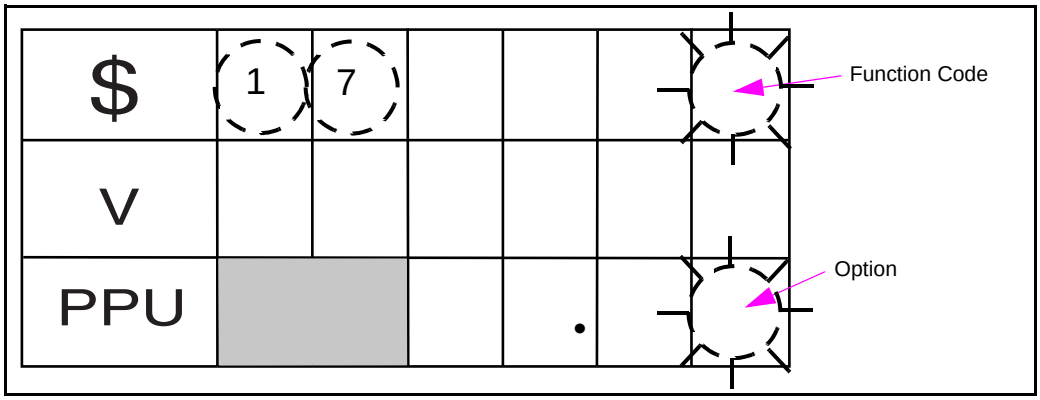
*Note: *For three grades, program as Grade 1, 3, 5, and 6 for an unblended hose (certain modifications may allow Grades 1, 2, 3, and 6).*

2 Enter low product blend percentage, then press **ENTER**. The high product blend percentage calculates automatically.

3 Repeat sequence for remaining grades and side, if required.

Command Code 17: Performing Master Resets and Programming Conversion Factors

Figure 5-25: Performing a Master Resets and programming conversion factors



To perform a Master Reset and programming conversion factors, proceed as follows:

1 To perform a Master Reset, press **1**, then **7**, and then press **ENTER**.

Function Code 1: Master Reset

To Program	Press Configuration
N/A	0
Master reset	1

2 Enter Function Code **1**, then press **ENTER**.
If you select Function Code 2 and press **ENTER**, then select "1" and press **ENTER**, the unit will perform a master reset. If you select "1" and press **ENTER,** it returns to the normal operation. See "Function Code 1: Master Reset" above.

3 Enter the configuration change Function Code **2**, then press **ENTER**.

Function Code 2: Conversion Factor

Note: Units will not operate without a conversion factor programmed.

To Program	Press Configuration
No conversion factor (Default)	0
U.S. gallons	1
Imperial gallons	2
Liters	3
1,012 pulses per gallon	4

4 Select conversion factor and then press **ENTER**.

Command Code 18

Do not use.

Command Code 19: Encore 300 Electronic Calibration Procedure

Ensure that you follow the order of the steps listed below. Failure to follow the steps in the order given will result in calibration not being properly completed. Electronic calibration must always be manually verified before returning the dispenser to service. Additional calibration information can be found in the "Pump Programming" section on page 5-1of this manual.

IMPORTANT INFORMATION

Never enter into Command Code 19 directly from any other Command Code if programming has just been done. If this is done, the calibration steps will appear to function and display properly, but actually will not. Always start with pressing **F1** and use appropriate PIN Codes to go directly into calibration mode.

IMPORTANT INFORMATION

If ATC is installed, product must be dispensed to exactly 20 liters in a 20 liter test can with no offset entered. Failure to do this will result in significant measurement errors in the net volume in the normal operating mode (200 and 300 modes).

1 Turn on (to right) the Weights and Measures switch. See Figure 5-74: Weights and Measures Switch on page 74.

2 On the Manager Keypad, press **F1**.

3 Enter Command Code **19** and press **ENTER**.

4 You will be prompted to enter the prover can size in the measuring units (for example, gallons, liters, and so on) that is programmed in Command Code 17. After entering prover can size, press **ENTER**.

5 Remove nozzle and select grade or lift lever.
Note: Only pure product can be calibrated.

6 For units without Automatic Temperature Compensation (ATC), dispense product into the prover can as close to zero volume as possible and hang up nozzle. For units with ATC, dispense exactly 20 liters into the calibration can. The Volume display will show the number of uncalibrated pulses. Any re-activation of the handle switch prior to completion of the calibration procedure will result in lost calibration.
Note: If a blender is being calibrated where either a pure low or pure high grade does not exist, it will be necessary to change a blend ratio in Command Code 16 temporarily to create the missing pure high or pure low grade. Revert the temporary grade back to actual once, for the missing pure grade to be calibrated.

7 Lower the pump handle or return nozzle to boot (nozzle activated lever).

8 Enter the offset (number of cubic inches or centiliters away from zero) and press **ENTER**.

9 Enter **0** if the offset is above **0** (zero) or **9** if the offset is below **0** (zero). Press **ENTER**.

10 The volume display will flash the adjusted volume (for example, 5.008 gallons is slightly less than + 2 cubic inches on the prover scale). You now have the option of pressing **CLEAR** to return to step 9 to re-enter the offset data.
Note: One cubic inch is .0043 gallon.

11 Press **ENTER** to return to main display to enter new prover can size, side or grade. The volume display will display the adjusted volume amount (for example, 5.008 should equal plus 2 cubic inches on the prover can scale).

12 When calibration is complete, turn off Weights and Measures switch to exit programming mode.
Note: Programming will be lost if Weights and Measures switch is turned off prior to the completion of calibration programming.

13 Press **F2** to return the unit to service.

Additional Manager Functions for Encore 300

The following manager functions are available when the unit is in normal operation.

Verifying Blend Ratios, Changes to Blend Ratios, and Configuration Changes

To verify Blend Ratios, Changes to Blend Ratios and Configuration Changes for blenders, proceed as follows:

1 Press **ENTER** on the Manager Keypad.

2 The PPUs will display the blend ratios programmed.
Note: The volume display will list the number of times that unit of volume configuration changes have been made. The sale display will show the number of times blend ratios have been changed.

3 Press **CLEAR** to exit.

Displaying Last Transaction (DLT)

The last transaction displays for 15 minutes after AC power is lost.

Unit Totals Retrieval Convention

Totals Examples

For both **$ TOTAL** and **VOL TOTAL** keys, press **ENTER** to toggle between grade and side selection.

Non-Resettable Money and Volume Totals

The dispenser maintains a set of non-resettable totals for each dispensed fuel grade. These totals reflect total money and volume since dispenser installation time. Following are keypad and display examples for viewing dispenser non-resettable money and volume totals.

Money and Volume Totals

Use the **$ TOTAL** key to retrieve money totals for each fuel grade. This and the **VOL TOTAL** key do not require a Security PIN Code. Use the **CLEAR** key to exit money totals mode. The "1" shown in the leftmost $ display indicates that this total is a non-resettable money total. The **VOL TOTAL** displays the volume for the grade selected. Volume for both sides of the unit can be viewed. Use the **CLEAR** key to exit the volume total mode. This convention comes from the Advantage series product line and is maintained here for ASC and site manager familiarity.

Displaying Pump Money and Volume Totals

To view Side 1 Totals, proceed as follows:

1. Press **$TOTAL** on Manager Keypad. Combined cash and credit total will appear for Grade 1, Side 1.

2. Select grade(s) using keypad. Read $ totals for each grade selected. The number of hose(s)/ grades(s) vary for each model.
   Note: For Blenders, grade 7 = high product, and grade 8 = low product.

3. To view side 2 money totals, press **ENTER**.

4. Press **VOL TOTAL**. Volume total appears for the grade selected.

5. Select grade(s) using keypad. Read volume totals for each grade selected. To view Side 2 Totals, press **ENTER**.

6. Select Side 2. Repeat "To view Side 1" steps (on next page) for Side 2.

7. Press **CLEAR** to exit.

Audit Trail Information

Figure 5-26: Advantage Dispenser Audit Trail Display - Newer, no main PPU display

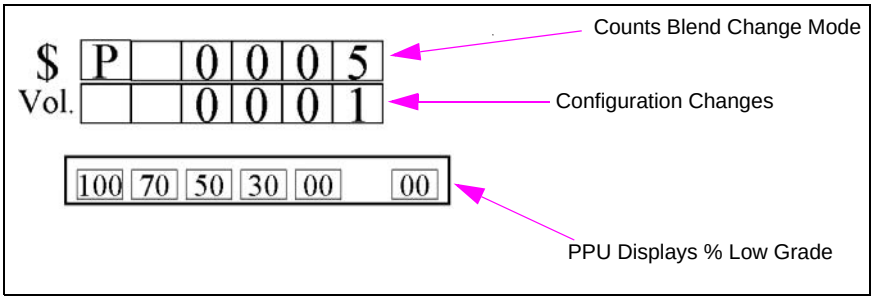


Figure 5-27: Advantage Audit Trail Display - Older SW Versions

Note: Refer to MDE-2540 The Advantage, Legacy and MPD Series Owners Manual for determining software versions.

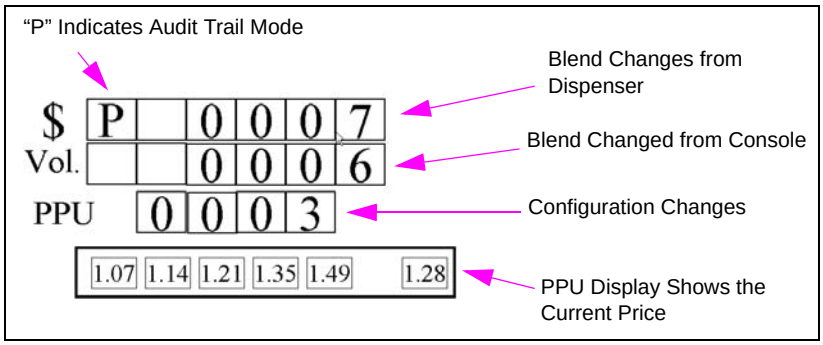

"P" Indicates Audit Trail Mode
$ P 0 0 0 7
Vol. 0 0 0 6
PPU 0 0 0 3
1.07 1.14 1.21 1.35 1.49 1.28
Blend Changes from Dispenser
Blend Changed from Console
Configuration Changes
PPU Display Shows the Current Price

Figure 5-28: Advantage Audit Trail Display - Newer SW Versions

Note: Refer to MDE-2540 The Advantage, Legacy and MPD Series Owners Manual for determining software versions.

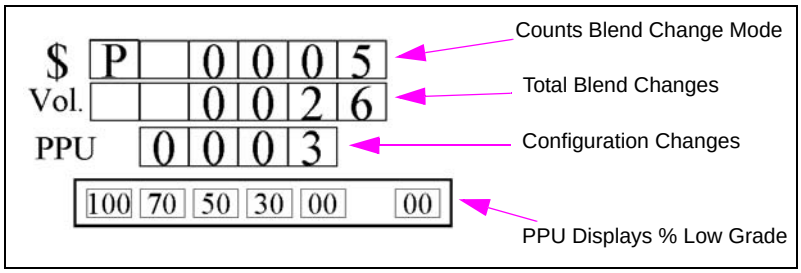

$ P 0 0 0 5
Vol. 0 0 2 6
PPU 0 0 0 3
100 70 50 30 00 00
Counts Blend Change Mode
Total Blend Changes
Configuration Changes
PPU Displays % Low Grade

Figure 5-29: Encore/Eclipse Audit Trail Display - Press Enter First Time

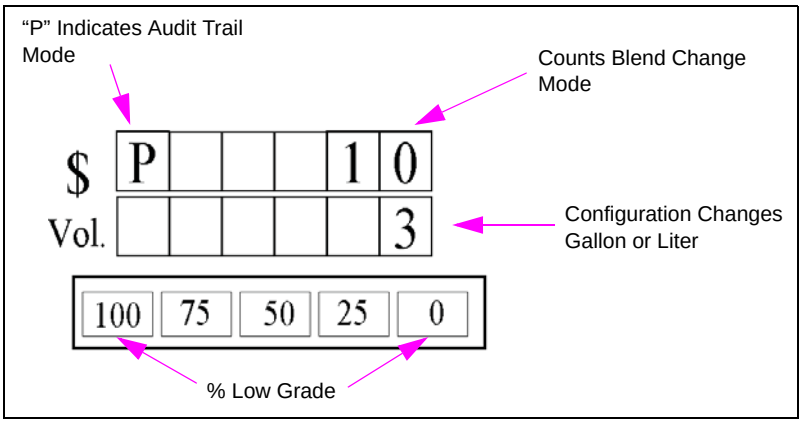

"P" Indicates Audit Trail Mode
Counts Blend Change Mode
$ P 1 0
Vol. 3
Configuration Changes Gallon or Liter
100 75 50 25 0
% Low Grade

Figure 5-30: Encore/Eclipse Audit Trail Display - Press Enter Second Time

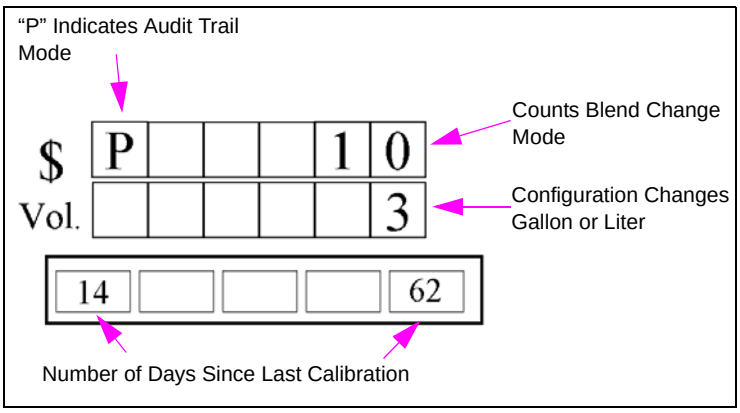

"P" Indicates Audit Trail Mode
Counts Blend Change Mode
$ P 1 0
Vol. 3
Configuration Changes Gallon or Liter
14 62
Number of Days Since Last Calibration

Figure 5-31: Encore/Eclipse Audit Trail Display - Press Enter Third Time

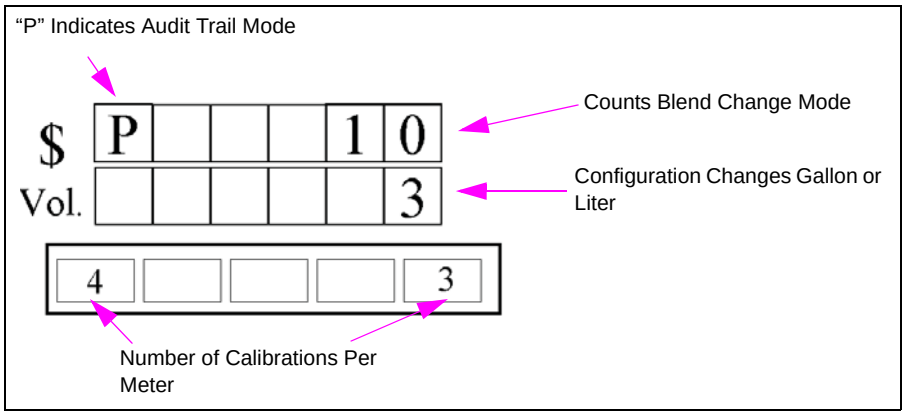
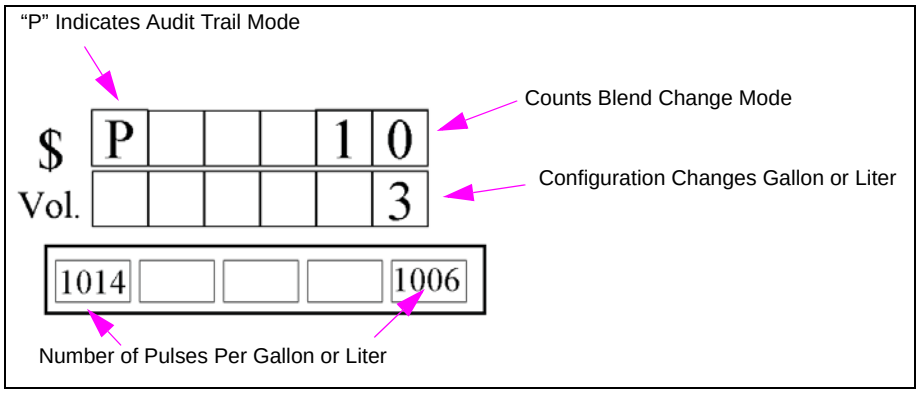


Figure 5-32: Encore/Eclipse Audit Trail Display - Press Enter Fourth Time


"P" Indicates Audit Trail Mode
$ P 1 0
Vol. 3
Counts Blend Change Mode
Configuration Changes Gallon or Liter
1014 1006
Number of Pulses Per Gallon or Liter

Programming the ATC Option

To program the ATC Option, proceed as follows:

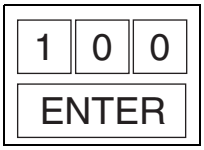
1 Place the programming switch located on the ATC Controller board in the "ON" position.

2 At power up:
- Programmed models will flash "104" and then, normal information
- Non-programmed models will flash "100" and requires the models to be programmed.

How To Program Each Fueling Position

1 Enter **100**.

2 Press **ENTER**.



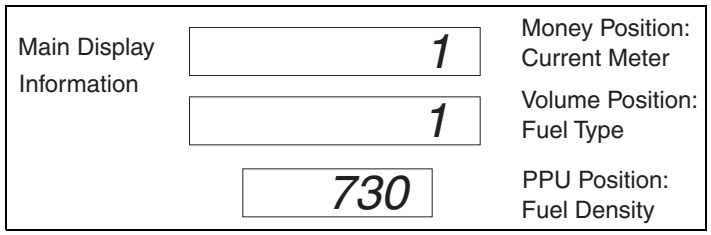
Note: If the program switch is "OFF", it will not work.

The money position will display "1". The money position shows which meter is selected. (Meter: 1 through 8)

The volume position will display "1". The volume position shows which fuel type has been selected.
(Fuel Type: 1-gasoline, 2-diesel)

The PPU position will display “730”. The PPU position shows which fuel density has been selected for the corresponding meter.
(Fuel Density: gasoline-730, diesel-840)

Note: The default value for Fuel Density is 730.



The software will sequence through each meter position for you to assign the fuel type desired.

3 Press **ENTER** after selecting the fuel type.

4 Sequence through each meter position and verify desired fuel type by pressing **ENTER**.

5 Place the programming switch on the ATC controller board in the “OFF” position.

6 Press **F2** to exit ATC programming mode.

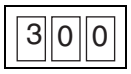
7 Weights and Measures auditor will put a seal on the programming switch.

8 Close electronics door as described in MDE-2531 Pump and Dispenser Start-up/Service manual.

How to Access ATC Mode Information

View Last Transaction

1 Enter 3-digit keypad code (reference definitions below).



2 Press **ENTER**.

3 Press **1** for Meter Position One information.

4 Press **ENTER**.

5 Record the information.

6 Continue to press each position number for corresponding position information.

7 Press **ENTER**.

8 Press **F2** to exit ATC Mode (Wait for one minute Time-out if "F2" is non-functional).

Definition/Function of ATC Codes

100 Programming Code

For instructions on programming ATC option see "Programming the ATC Option" on page 5-34.

200 Inspection Mode

Access this mode to obtain a precise reading of ATC system operation during an actual transaction. This is the most accurate means of checking ATC system accuracy because temperature readings are displayed during transaction.

Pure product only: Program a blender for 100% otherwise the PPU display shows error code 105-product error.

- Money display-shows uncompensated volume
- Volume display-shows compensated volume
- PPU display-shows real-time temperature (in Celsius).

300 View Last Transaction

Access this mode after a transaction. This mode can be used as a basic check to ensure that the ATC system is operating properly. Temperature displayed in this mode is an average during the last transaction. Do not use this mode to verify the accuracy of the ATC system.

There are no blender restrictions.

- Money display-shows uncompensated volume.
- Volume display-shows compensated volume.
- PPU display-shows average temperature (in Celsius).

301 Display Volume Correction Factor (VCF)

- Money display-shows product number.
- PPU display- shows volume correction factor.

302 Display Density

PPU display-shows selected meter's programmed density information.

303 Display Temperature

PPU display-shows selected meter's current product temperature.

304 Display Gross Volume Totals

Volume and PPU displays-shows a ten digit number representing the selected meter's cumulative uncompensated volume total for a pure product.

500 Software Version

Main display-shows software version number.

600 Troubleshoot Probe

Access this mode to troubleshoot probes. There should be a small change in readings every second if T-Meter and controller board are working properly. Each probe can be checked by entering meter number.

- Money display-pulse width in terms of counts.
- Volume display-probe resistance in ohms.
- PPU display-shows the temperature of probe (in Celsius).

601 Probe History

Use this mode to display probe history since ATC was installed. This is useful for troubleshooting intermittent probes or probe connections. Access each probe by entering meter number.

- Money display-shows probe number entered.
- Volume display-shows total number of probe range errors logged.
- PPU display-shows total number of missing probe pulse errors.

Error Codes

Error	Error Code	Description
Programming Error	100	All fuel types not programmed
Rom Checksum	101	Controller ROM checksum error
Ram Error	102	Controller RAM write/read error
T-Meter Dead	103	Not receiving any T-meter pulses
T-Meter Sync	104	Receiving T-meter pulses, but with errors
Product Error	105	Multiple product selected
Ramp Range Error	106	Gilbarco use only
Range Error For Probe	107	Probe out of range
Missing Error	108	Probe information missing
Pulser Error	109	Pulser fail
Reset JJ Error	110	Reset jump jack is installed
Ram Corrupted	111	RAM data corrupted
No Input Timer	112	No timer A interrupts occurring
No Output Timer	113	No timer B interrupts occurring
Power Fail Error	114	Power fail signal stuck
Recursion Error	115	Read T-meter interrupt recursion

Note: Refer to MDE-2531 Pump and Dispenser Start-up/Service manual for additional troubleshooting information if needed.

Programming Encore 5XX and Eclipse Series Units

Contents in this Sub-Section

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PIN Code Entry	5-39
Encore 5XX and Eclipse Programming Quick Reference	5-40
Level One Command Codes	5-41
Level Two Command Codes	5-48
Level Three Command Codes	5-65
Level Four Command Codes	5-88

Software Versions

Software versions can be obtained by using the Laptop Tool for a complete listing or Power up for a partial display.

PIN Code Entry

Programming Level	Default PIN Code	Command Code Range
Level 1	2222	20 - 39
Level 2	1503	40 - 69
Level 3	1309	70 - 89
Level 4	0128	90 - 109

- Press **F1** to perform additional programming
- Press **ENTER** after making selection in all Levels
- Press **F2** to exit programming

Note: Use of a higher level Encore 5XX/Eclipse PIN Code will allow access to lower level programming codes as well (for example, keying the Level 3 PIN Code will allow access to Level 1, 2, and 3 programming but not Level 4).

Encore 5XX and Eclipse Programming Quick Reference

Command Codes and Function Codes Quick Reference Chart

The following chart shows level Command Codes and Function Codes where applicable. Refer to the following pages for more detail.

Level One Command Codes
(Starts on page 5-41)

- 20 Set PPU Values
- 21 Not applicable
- 22 Set Preset Types and Values
  - 1 Set Preset Type
  - 2 Set Preset Amounts
  - 3 Set PPU ON/OFF
- 24 Set Operations Mode
  - 1 Two Wire*
  - 2 Standalone
- 25 Set Allocation
- 27 Review ATC
  - 2 Display Volume Correction Factor
  - 3 Display Fuel Density
  - 4 Display Temperature
  - 5 Gross Volume Totals
  - 6 Software Version
  - 7 Real Time Transaction
  - 8 Engineering Audit
- 28 Change First Level PIN

Level Two Command Codes
(Starts on page 5-48)

- 40 Set Two-Wire ID (pump number)
- 41 Set PPU Options
- 42 Set Decimal Point Options
  - 1 Main Display Money
  - 2 Main Display Volume
  - 3 PPU for Calculations
  - 4 PPU for Display
- 43 PPU Blinking Options
- 44 PPU Grade Mapping
- 45 Set Lamp Test Time
- 46 Set Comma/Decimal Point
- 47 Set Reported Money Size
- 48 Zero Previous Transaction
- 49 STP Controls
  - 1 Set STP Prestart
  - 2 Set STP Control
- 51 Set Main Beeper
- 52 Set VaporVac Alarms
- 53 Set Time-Outs
  - 1 Set Beeper
  - 2 Set Pre-Select
  - 3 Set Dispenser
  - 4 Set Initial Dispenser
- 54 Set Slowdown Valve
- 55 Set Hose Pressurization
- 56 Set Stop Button Control
- 60 Set Clock and Calendar
- 62 Two-Wire Remapping Grade

Level Three Command Codes
(Starts on page 5-65)

- 71 Set Volume Units
- 72 Set Blend Ratios
- 73 Set/Display Money Totals
- 74 Set/Display Volume Totals
- 75 Set Fuel Density
- 77 Change PIN Code
  - 1 Level One
  - 2 Level Two
  - 3 Level Three
  - 4 Level Four
- 78 Electronic Calibration
- 80 Set Maximum Flow Rate
- 82 Set Calibration Can Size

Level Four Command Codes
(Starts on page 5-88)

- 90 Set Unit Type
- 91 Select Installed Options
  - 1 Preset Type
  - 2 Push to Start
  - 3 Set VaporVac
  - 5 Set Push to Stop
  - 6 Set ATC
  - 11 Set Totalizer function
  - 12 Set Nozzle activated Pump Handle
  - 13 Set Meter Type
- 92 Set Side Exits
- 93 Set Cash/Credit at Dispenser
- 94 Set Zero PPU Option
- 96 Feature Set

Encore 5XX and Eclipse Programming Instructions

Level One Command Codes

Level 1 commands are those commands most commonly performed on site by station owner/ operator.

Programming Level	Default PIN Code	Command Code Range
Level 1	2222	20 - 39

- Press **F1** to perform additional programming
- Press **ENTER** after making selection in all Levels
- Press **F2** to exit programming.

Note: Entry of Level 2, 3, or 4 PIN Codes will also allow entry into Level 1 programming.

Layout and digit position meaning for programming features are shown below each Command Code.

Command Code 20: Set PPU Values

Layout and digit position meaning for this programming feature is shown below.

Figure 5-33: Setting the PPU Values

$	2	0				Side
V				Grade		Level
PPU			Price	.Price	Price	Unit/ Price

1 Press **2**, then **0**, then **ENTER** to access this Command Code.

2 Select side, then press **ENTER**.

To Program	Press Configuration
Side 1 (side with junction box)	1
Side 2	2
Both Sides	3

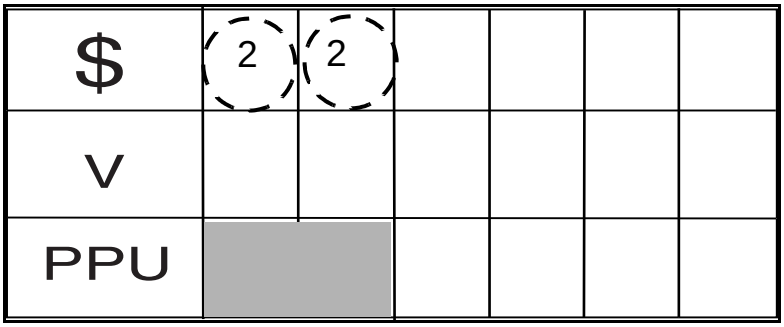
3 Select Price Level (**Cash/Credit**).

4 Enter new PPU number.
Note: Repeat for other Side, Grade and Price Level.

Command Code 22: Set Preset Types and Values

Command Code 22 allows programming the keypad preset when set up in Level 4 configuration programming. When values are programmed for the keypad preset buttons, they set the same values for both sides of the dispenser. All fueling positions must have the same type of preset.

Figure 5-34: Setting the Preset Types and Values



1 Press **2**, then **2**, then press **ENTER** to access this Command Code.

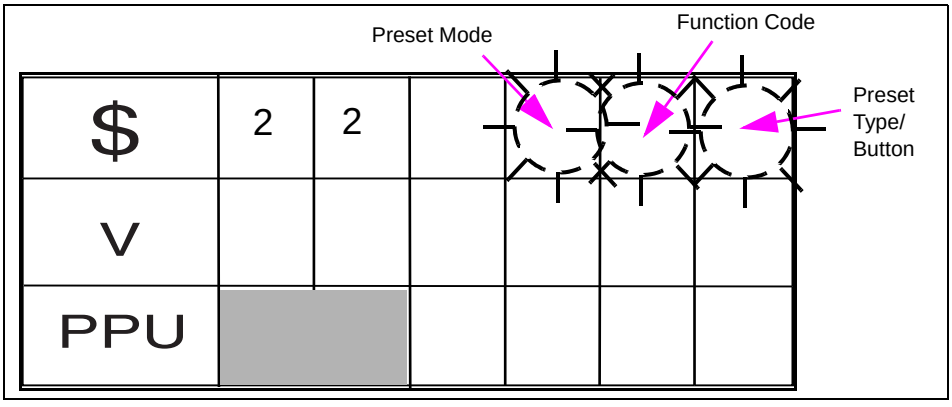
If "NO KEYPAD PRESET" was set in Level 4 configuration, then a programming error display will result as described in the Dispenser programming section.

Table below shows programming options for preset operations.

Preset Mode	Function Code	Preset Type
1 = 5 Button Preset	1 = Set Preset Type	1 = Money
2 = Incremental Preset	2 = Set Preset Amounts	2 = Volume
3 = PPP	3 = Set PPP ON/OFF	1 = ON, 0 = OFF

Default amounts for presets are 1, 2, 5, and 10 for both money and volume units.

Figure 5-35: Setting Money and Volume units



2 Select **Function Code 1**: Set Preset Type. Press **ENTER**.
Note: Display toggles to the Function Code selection.

3 Display indicates preset option set up in Lever 4 Programming. Press **ENTER** to select Preset Type.

4 Select **Function Code 2: Volume Preset Type**. Press **ENTER** (to accept Volume Preset Type).
Note: Accepts set Preset Type. Display toggles back to Function Code selection.

5 Select **Function Code 2: Set Preset Amounts**
Note: Main money display shows button field active and main volume display shows current amount associated with button. Begin Preset Amounts entry.

6 Select appropriate Preset button, then press **ENTER**.

7 Key in **Preset Amounts**. Press **ENTER**.
Note: Accepts preset amount and toggles back to button selection.

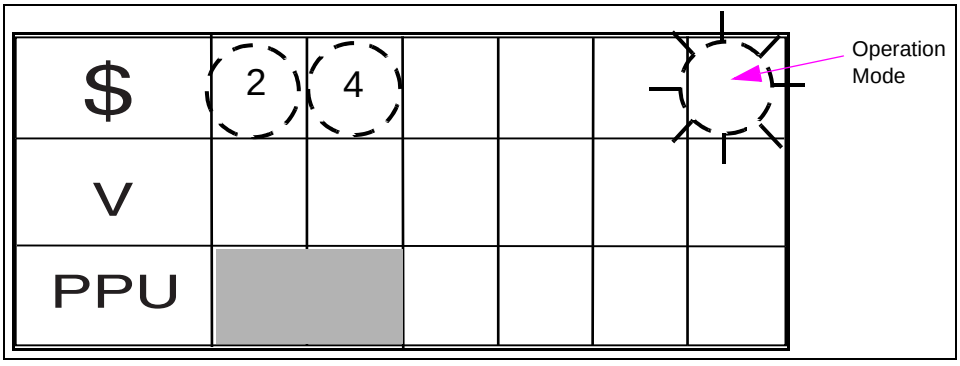
8 Select **Function Code: Set Preset Types and Value**, press **ENTER**.
Note: Accepts set Preset Type. Display toggles back to Function Code selection.

9 Select **Function Code 3: PPP Activation**, Press **ENTER**.
Select PPP **ON** or **OFF,** then press **ENTER.**

Command Code 24: Set Operations Mode

Command Code 24 is entered in Level 1 programming to set dispenser operating mode. Operation mode setting determines how dispenser is controlled remotely or if it operates without external control. Available choices for operation mode setting are shown below.

Figure 5-36: Setting Operations Mode



1 Press **2**, then **4**, then press **ENTER** to access this Command Code.

2 Using the following table, select Mode of Operation option.

Option	Operation Mode
1 (Default)	2-Wire
2	Standalone
3	IFSF

3 Press **ENTER** to accept mode of operation.

Command Code 25: Set Allocation

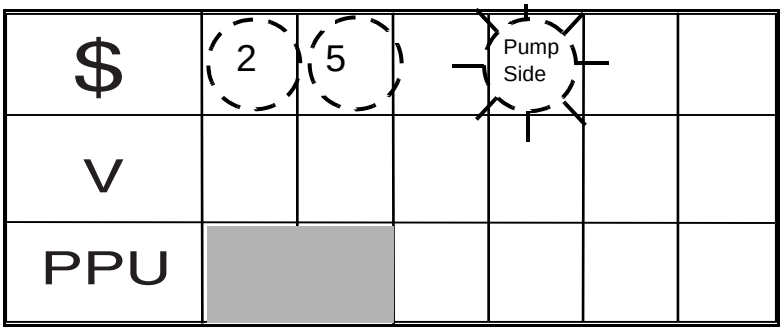
Command Code 25 is entered in Level 1 programming to set side and grade allocation volumes.

Note: Decimal point position may change in main volume display, depending on its location from display decimal point programming. Default allocation setting is none or all zeros.

1 Press **2**, then **5**, then press **ENTER** to access this Command Code.

Note: Layout and meaning of the digit position for this programming feature is shown below.

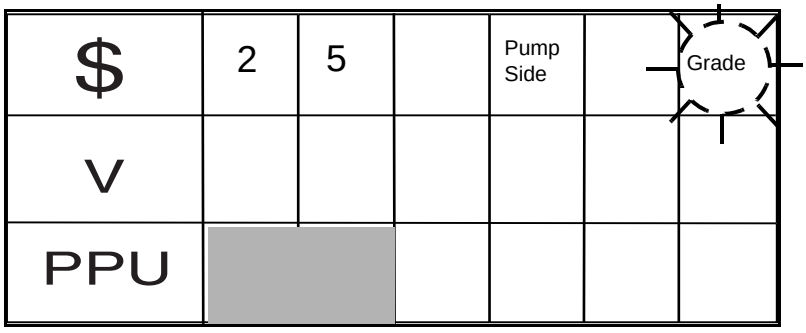
Figure 5-37: Layout and Digit Position



2 Select side, then press **ENTER** to access this Command Code.

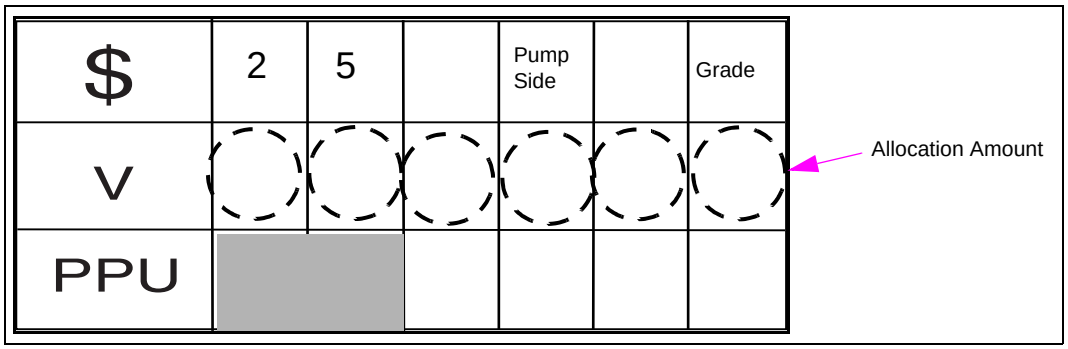
To Program	Press Configuration
Side 1 (side with junction box)	1
Side 2	2
Both Sides	3

Figure 5-38: Grade Selection



3 Select Grade, then press **ENTER**.

Figure 5-39: Setting Amount Allocation



4 Set **Allocation Amoun**t in the Volume display, then press **ENTER**.

Command Code 26

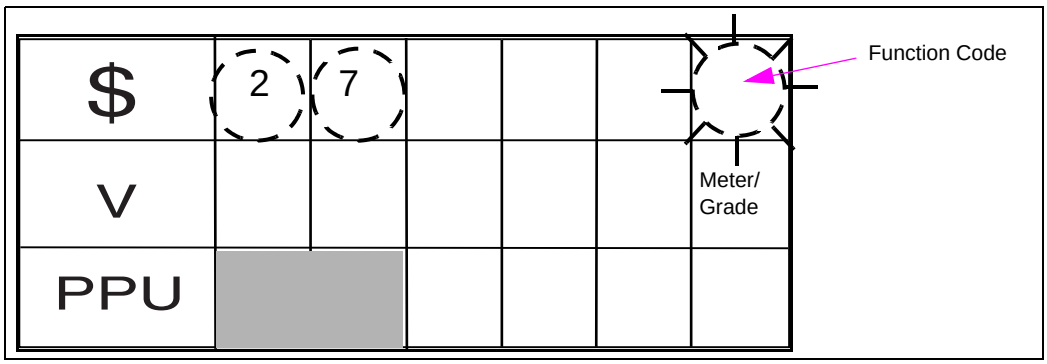
Not used.

Command Code 27: Review ATC Data

Command Code 27 is entered in Level 2 programming to access Automatic Temperature Compensation (ATC) data. Function Codes in this programming level provide read only access to ATC operating parameters. No changes can be made to operating parameters at this level. Default Function Code (1) provides for audit of last transaction data.

Notes:1) Attempting to use this Command Code when ATC is not installed will result in a display error as described in the "Pump Programming" section on page 5-1 of this manual.

Figure 5-40: Reviewing ATC Data



2) Complete ATC data will be shown in displays, depending on specific Function Codes as described in sub-sections that follow.

1 Press **2**, then **7**, then **ENTER** to access this Command Code.

2 Using the following table, select Function Code number (**1-8**), then press **ENTER**.

Table below shows Function Codes available and keypad programming for CC27.

Function Code	ATC Functions and Description	Function Code Keypad Programming in CC27
1(Default)	Audit last transaction: Provides display of uncompensated and compensated product volumes (single meter) in main money and volume displays respectively. Average transaction temperature for the selected inlet is shown in PPU display for selected meter. ATC data is reported after inlet selection has been entered in main volume display. *Note: On blended product, one would have to view both pure products and manually add them to create blended totals (volume and sale).*	• ENTER (accepts default FC) • Select meter • ENTER • Select next meter • ENTER
2	Display Volume Correction Factor (VCF): Provides display of VCF for a selected product (meter). VCF is based on currently sensed meter temperature. ATC data is reported after meter selection has been entered in main volume display.	• Select FC 2 • ENTER • Select meter • ENTER • Select grade • ENTER
3	Display fuel density: Provides display of density for a selected meter. Displayed density for a particular grade reflects density assignment made in Level 4 programming. ATC data is reported after grade selection has been entered in main volume display	• Select FC 3 • ENTER • Select meter • ENTER • Select next meter • ENTER
4	Display temperature: Provides display of the temperature in Celsius for a selected meter	• Select FC4 • ENTER • Select meter • ENTER [1] • Select next meter • ENTER [1]
5	Display gross volume totals: Provides display of gross volume totals for a selected meter	• Select FC5 • ENTER • Select meter • ENTER • Select next meter • ENTER
6	Display software version: Provides display of ATC neuron software version number	• Select FC6 • ENTER
7	Real time transaction: Provides means to monitor ATC operation during a transaction. Monitored data includes uncompensated volume, compensated volume and product temperature for product selected. Product selection will be accomplished by sensing the coincidence of grade authorization and pulser activity. After product selection, both money and volume displays are zeroed and product temperature will be displayed in PPU display. During real-time transaction mode, money display on each side will show uncompensated volume for selected product. Volume display on each side will display compensated volume for selected product. Finally, PPU display on each side will show current temperature in Celsius. End of a transaction is determined when all grade authorization signals become inactive. End of a transaction results in both money and volume displays being blanked with 8s shown in each PPU digit.	• Select FC7 • ENTER [1,2] • ENTER (avoid time-out)

Function Code	ATC Functions and Description	Function Code Keypad Programming in CC27
8	Engineering audit: Engineering audit mode is intended for use by Gilbarco Engineering personnel to judge performance of ATC system. Mode provides information on t-meter operation and temperature data conversion. Typically, customer or ASC will not need to access this mode. Money display shows probe width and volume display shows temperature in Celsius. Values are updated continuously.	• Select FC8 • ENTER • Select grade • ENTER [3] • Select next grade • ENTER [3]

Notes:

1. Display indicates '0' for a negative temperature value and is blank for a positive value. (Current PPU display cannot display a "-" character).

*2. When **ENTER** is pressed, display will blank money and volume displays of both sides and show 8s in the PPUs. When fuel flow is detected, display will show real-time uncompensated volume in money display, compensated volume in volume display and temperature in PPU displays. When the transaction is complete, display will retain transaction data for 1 minute and then revert back to blank money and volume displays with 8s shown in PPUs. One minute time-out can be avoided by pressing **ENTER**.*

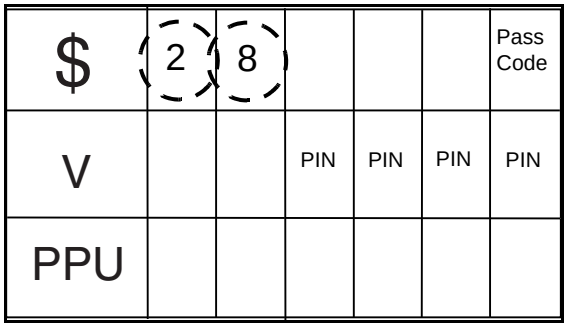
3. "-" Indicates a negative temperature value and is blank for a positive value. Money display shows probe width and volume display shows temperature in Celsius. Values are updated continuously.

Command Code 28: Change First Level PIN

Allows Site Manager to change site management level (Level 1) PIN Code. Entering new digits for new code changes display as digits are entered. Display does not show actual PIN digit; it only shows a '**0**' to signify that a number was entered. Same PIN Code must be entered twice to be accepted.

First pass at entering PIN Code is signaled by a "1" displayed in Pass Code display. Second pass is signaled by a "2" appearing in Pass Code display. Acceptance of a PIN Code is signaled by a "3" appearing in Pass Code display. A zero in Pass Code display indicates that the PIN Code was not accepted. Layout and digit position shown below:

Figure 5-41: Changing the First Level PIN



1 Press **2**, then **8**, then press **ENTER** to access this Command Code.
Note: Pass Code displays 1 for first pass.

2 Enter PIN Code: XXXX, then press **ENTER**.
Note: Pass Code displays 2, prompting a second pass.

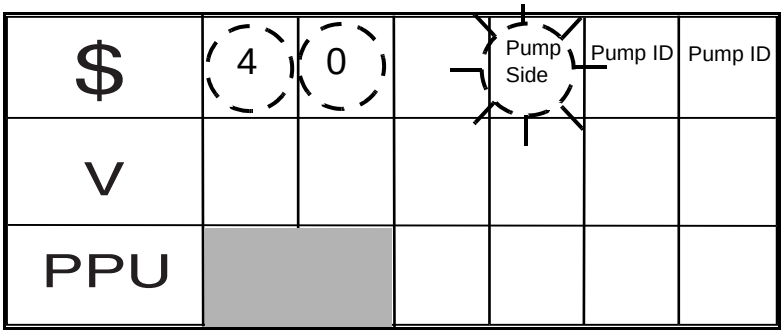
3 Enter PIN Code again, then press **ENTER**.

Level Two Command Codes

Set 2 wire ID (Pump number): Command Code 40

Command Code 40 is entered in Level 2 programming to set pump ID number. Address range is “1” to “16”. Pump side ID default values are Side 1 = 7 and Side 2 = 11. Layout and digit position meaning for this programming feature is shown below:

Figure 5-42: Setting Pump ID Number

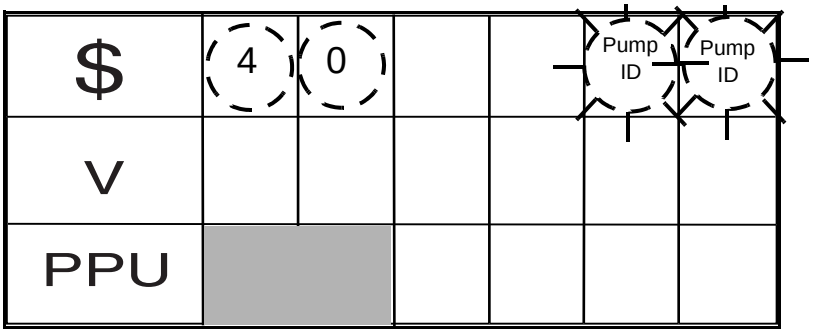


1 Press **4**, then **0**, then press **ENTER** to access this Command Code.

2 Select side, then press **ENTER**.

To Program	Press Configuration
Side 1 (side with junction box)	1
Side 2	2

Figure 5-43: Pump ID Number

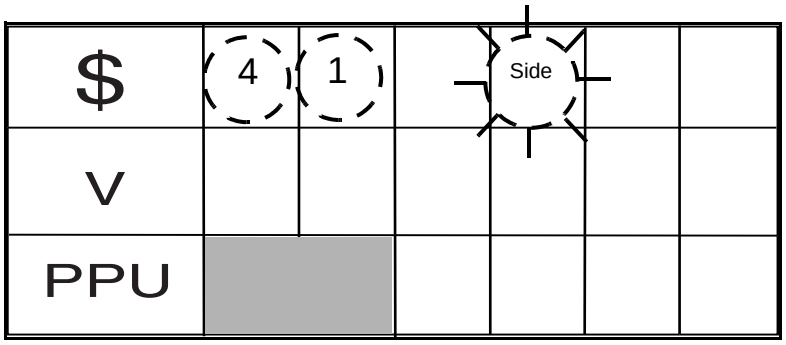


3 Enter Address (**1 - 16**), then press **ENTER**.

Command Code 41: Set PPU Options

Dispenser contains two sets of PPU prices, Level 1 and Level 2. PPU price levels can be displayed at dispenser on either single or dual PPU display devices per fuel grade. Programming options provided with this Command Code determine which PPU display device(s) the PPU values appear on, order in which they appear, and where the displayed value comes from. Default for this option is selection 1. Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-44: Layout of Digit Position for Programming Feature

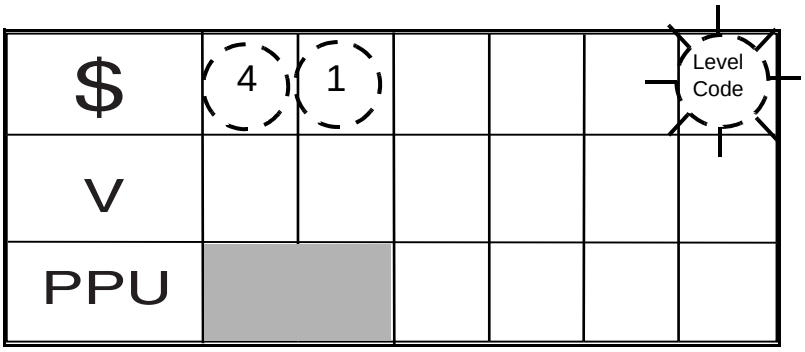


1 Press **4**, then **1**, then press **ENTER** to access this Command Code.

2 Select side, then press **ENTER**.

To Program	Press Configuration
Side 1 (side with junction box)	1
Side 2	2

Figure 5-45: Layout of Digit Position for Programming Feature



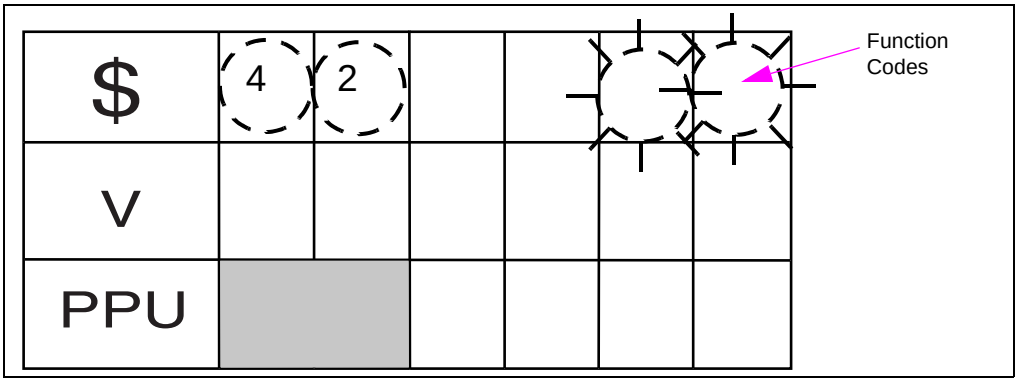
3 Select Level Code (**1** - **4**), then press **ENTER**.

Level Code	L1 Display	L2 Display
1 (Default)	From POS	N/A
2	L1	L2
3	L2	L1
4	N/A	From POS

Command Code 42: Set Decimal Point Options

Command Code 42 is entered in Level 2 programming to assign decimal point locations. Function Codes 1 through 4 are selected to set location of money and volume decimal points for display and calculation purposes. Entry into Command Code 42 will select Function Code 1 by default. Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-46: Set Decimal Point Options



1 Press **4**, then **2**, then press **ENTER** to access this Command Code.

2 Select Function Code (**1 - 4**) from the following table, then press **ENTER**.

Function Code 1: Set Money Decimal Point Position for Display
The table below indicates locations where main money display decimal point can be positioned via Command Code 42, Function Code 1.

Position Parameter Options	Decimal Point Positions
1	XXXXXX
2	XXXXX.X
3 (Default)	XXXX.XX
4	XXX.XXX

1 Press Function Code **1**, then press **ENTER**.
Note: Accepts default Function Code - Main Money Display

2 Select Position Parameter Option (**1-4**), then press **ENTER**.

Function Code 2: Set Volume Decimal Point Position for Display
The table below indicates locations where main money display decimal point can be positioned via Command Code 42, Function Code 2.

Position Option	Decimal Point Positions
1	XXXXXX
2	XXXXX.X
3	XXXX.XX
4 (Default)	XXX.XXX

1 Press Function Code **2**, then press **ENTER**.

2 Select Position Parameter Option (**1-4**).

3 Press **ENTER** to save setting.

Function Code 3: Set PPU Decimal Point Position for Calculations (Canada Only)
The table below indicates locations where PPU calculation decimal point can be located. Default PPU decimal point for calculations is position 4.

1 Press Function Code 3, then press **ENTER** to access this Command Code.

2 Select Position Parameter Option (**1-4**), then press **ENTER**.

Position Option	Decimal Point Positions
1	XXXX
2	XXX.X
3	XX.XX
4 (Default)	X.XXX

Function Code 4: Set PPU Decimal Point Position for Display
The table below indicates where PPU display decimal point can be positioned. Default PPU decimal point for display is position chosen in section 6.4.3.4.

1 Press Function Code 4, then press **ENTER** to access this Command Code.

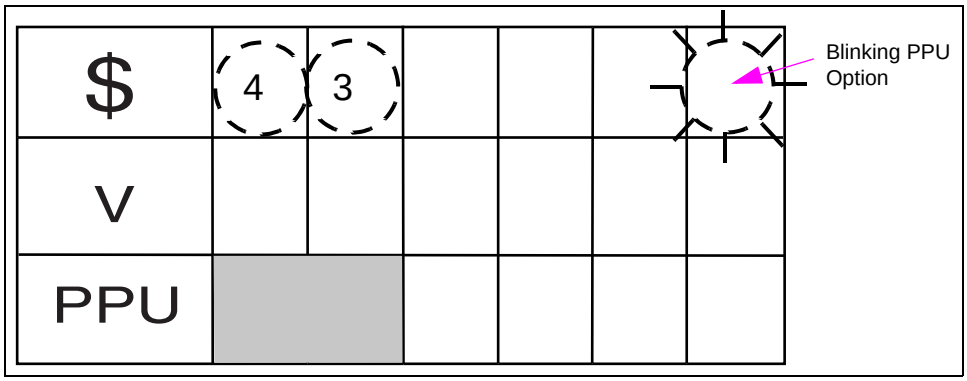
2 Select Position Parameter Option (**1-4**) from the following table, then press **ENTER**..

Position Option	Decimal Point Positions
1	XXXX
2	XXX.X
3	XX.XX
4 (Default)	X.XXX

Command Code 43: PPU Blinking options

Command Code 43 is entered in Level 2 programming to set PPU blinking functionality. This allows programmer to set PPU displays for blinking on and off under certain conditions. On a single hose blender, MPD, or Master/Satellite, setting this option to “ON” will cause all PPU displays to blink after pump handle is raised (or in this case if nozzle is removed from an auto-on pump handle). Blinking stops when grade select button is pressed. Default for this option is selection 1. This programming option affects all sides of dispenser – all sides are programmed the same.

Figure 5-47: PPU Blinking Options



1 Press **4**, then **3**, then press **ENTER** to access this Command Code.

2 Use the following table to select "ON"/"OFF" Option.

Table below shows the available options for this Command Code.

Blinking Code Option	State
1 (Default)	On
2	Off

3 Press **ENTER**.

Command Code 44: PPU Grade Mapping

Command Code 44 is entered in Level 2 programming to map fuel grades to PPUs. This allows programmer to change normal mapping of grades to PPU displays. **It does not change the grade-to-valve mapping.** This is used on single hose blenders and single hose MPDs.

Notes:1) Attempting to use this command on units other than single hose blenders and single hose MPDs will result in an error display condition as described in the section on Dispenser Programming.

2) Setting jump jacks for the PPU boards can map the PPUs and grade to value.

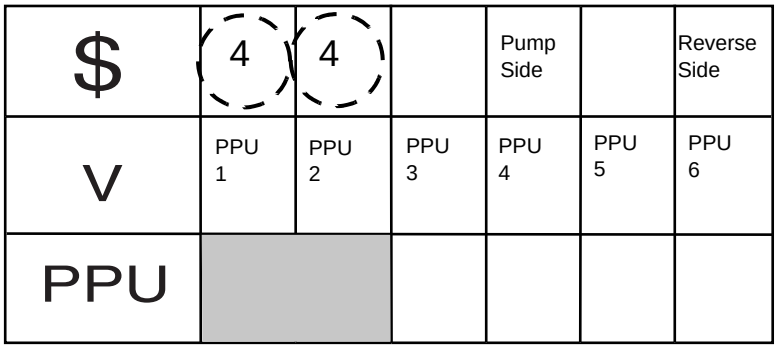
If "Reverse Side" is set, then side two will reverse order of side one entries onto side two.

Default setting is always one for one with "Reverse Side" setting disabled "0".

Note: This will also implicitly redirect totalizer-addressing scheme to reflect PPU mapping. Totalizer will be remapped to PPU to total flow from remapped grade.

Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-48: PPU Grade Mapping



Example for keypad programming:

Note: Due to complexity of grade select mapping, following example is provided, showing keypad sequence for re-mapping default PPU mappings to Grade 2 mapped to PPU 1 and Grade 1 mapped to PPU 2.

1 Press **4**, then **4**, then press **ENTER** to access this Command Code.

2 Select side from the following table, then press **ENTER**.

To Program	Press Configuration
Side 1 (side with junction box)	1
Side 2	2

3 Press **ENTER** again to disable Reverse Setting.

4 Use the following table to select Grade Mapping.

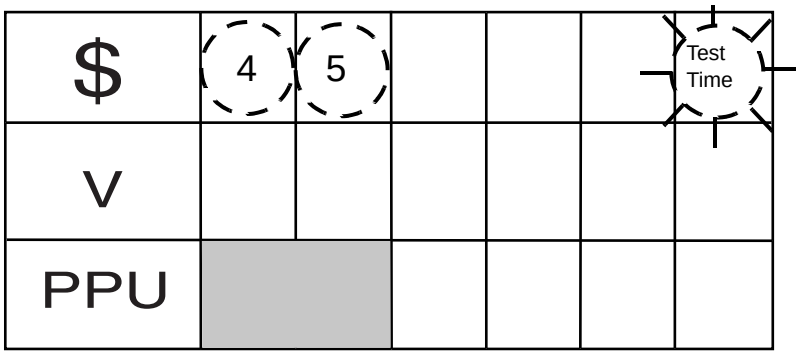
To Program	Press Configuration
Grade 1 mapped to PPU 2	1
Grade 2 mapped to PPU 1	2

5 Press **ENTER**.

Command Code 45: Set Lamp Test Time

Command Code 45 is entered in Level 2 programming to set time duration of lamp test. Lamp test time determines the amount of time allotted for the system to run a line leak test prior to opening the dispenser valves. Maximum allowed lamp test time is 9 seconds, minimum is 0 seconds and default test time is 3 seconds. Basic test sequence is all 8s, blanks, 0s, transaction PPU.

Figure 5-49: Setting Lamp Test Time



1 Press **4**, then **5**, then press **ENTER** to access this Command Code.

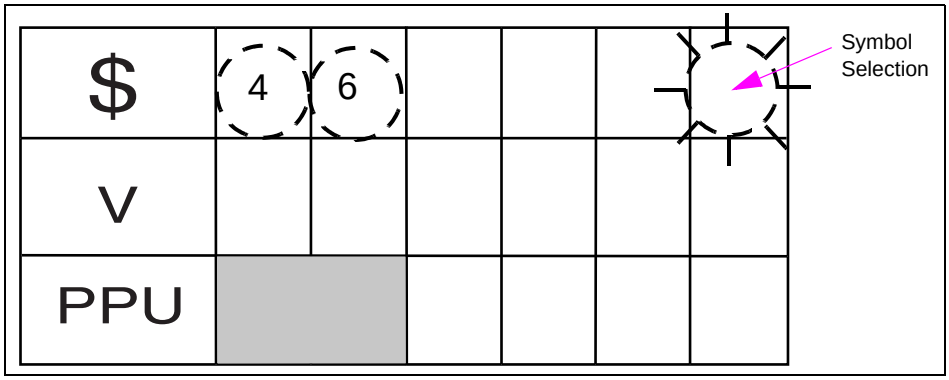
2 Select Lamp Test time (**0**-**9** seconds).

3 Press **ENTER**.

Command Code 46: Set Comma/Decimal Point

Command Code 46 is entered in Level 2 programming to select comma or decimal point display at main transaction and PPU displays.

Figure 5-50: Setting Comma/Decimal Point



1 Press **4**, then **5**, then press **ENTER** to access this Command Code.

2 Select the symbol option (**1**-**2**) from the following table.

Symbol Options	Symbol
1 (Default)	Decimal Point
2	Comma

3 Press **ENTER**.

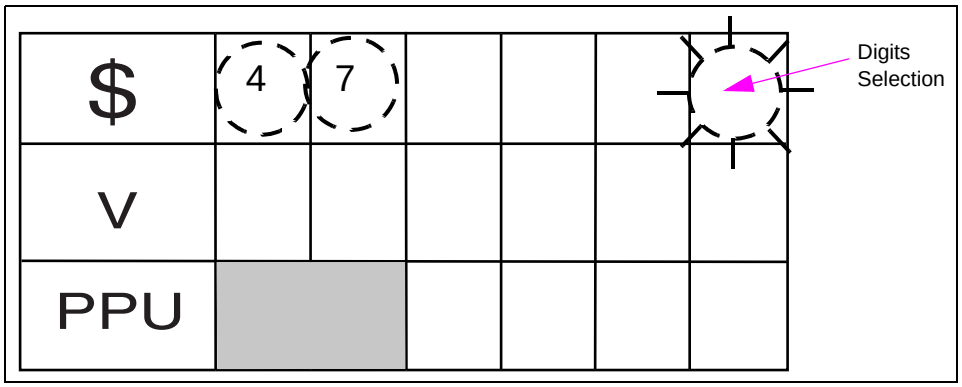
Command Code 47: Set Reported Money Size

Command Code 47 is entered in Level 2 programming to set method by which transaction money amount is returned to console over 2-wire communication loop. This Command Code is for third party international consoles supporting six digits. Selection 1 is default and returns money in the following format with an implied decimal point as shown:

XXX.XXY

For programming option 1, least significant digit (shown as Y in the above example) is not used and should be discarded. All known consoles in the USA use this default. Option 2 means that all six digits of money display are returned with an implied decimal point as selected for money display. In this case, all six digits of money reported over the 2-wire communications loop are meaningful.

Figure 5-51: Setting the Reported Money Size



1 Press **4**, then **7**, then press **ENTER** to access this Command Code.

2 Select the Digit Selection Option (**1**-**2**) from the following table.

Digit Selection Option	Return Digits
1 (Default)	Return 5 Digits
2	Return All 6 Digits

3 Press **ENTER**.

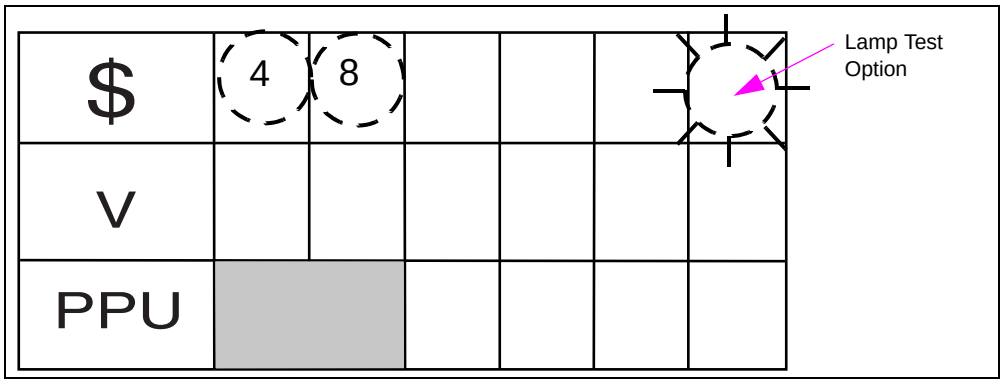
Command Code 48: Zero Previous Transaction

Command Code 48 is entered in Level 2 programming to determine when dispenser displays will be zeroed out and previous transaction cleared internally. Default is option 1, after lamp test. Option 2, before lamp test, results in the dispenser being reset to zero the transaction displayed after:

- The pump handle is activated (raised) and unit is authorized
- No fuel is dispensed
- The handle is deactivated (lowered)

Note: Option 2 is required in New Jersey and is generally known as the New Jersey Display Option.

Figure 5-52: Zero Previous Transaction



1 Press **4**, then **8**, then press **ENTER** to access this Command Code.

2 Using the following table, select (1-2) for the Lamp Test Option.

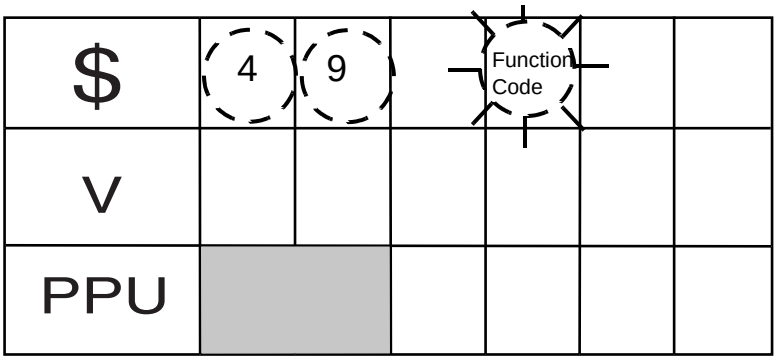
Option	Setting
1 (Default)	After Lamp Test
2	Before Lamp Test

3 Press **ENTER**.

Command Code 49: STP Controls

Command Code 49 programming is used to set when the STPs will turn on, which STPs will be activated and where the STP relay signal originates. Sub-sections that follow describe each Function Code programming option. Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-53: STP Controls

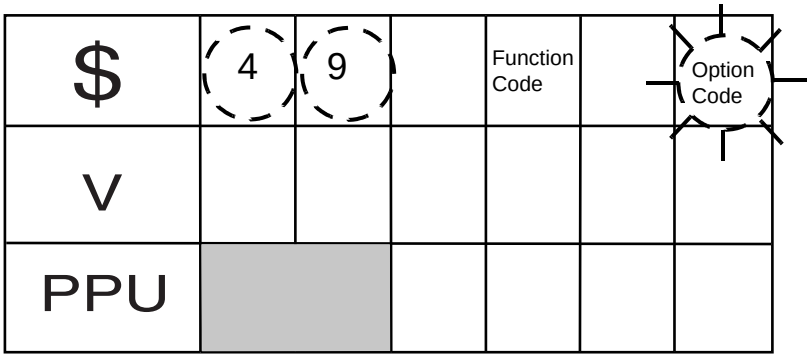


1 Press **4**, then **9**, then press **ENTER** to access this Command Code.

2 Select the Function Code (**1-3**). See the following listing.

3 Then select the appropriate Option Code.

Figure 5-54: Selecting the Option Code



Function Code 1: Set STP Prestart

STP pre-start should be programmed depending on type of leak detection implemented in dispenser. Pre-start should be set to “ON” for mechanical line leak detectors and “OFF” for electrical line leak detectors. Default for this option is selection 1, “PRESTART OFF”. “PRESTART ON” turns the STPs on when the handle switch is activated.

1 Using the following table, select option (**1-2**).

Option	Function
1 (Default)	Prestart OFF
2	Prestart ON

2 Press **ENTER**.

Function Code 2: Set STP Control

Option determines how STPs will be controlled during a fueling operation. Option 1 is default and results in only the STP(s) necessary for fueling operation to be turned on. Option 2 turns on all STPs anytime there is a fueling operation. Option 3 turns on only the STP(s) required for fueling operation until backward pulses are sensed from a meter not used for the fueling operation. At that time, the STP associated with the backward turning meter is turned on for the duration of the fueling operation.

1 Using the following table, select option (**1-3**).

2 Press **ENTER**.

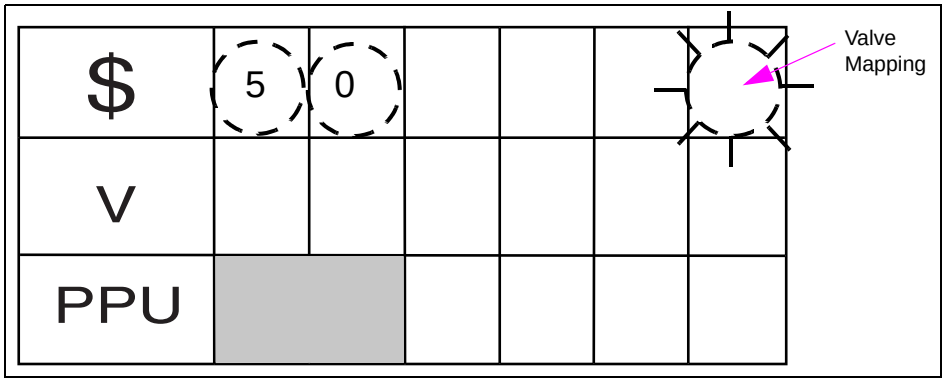
Option	STP Option
1 (Default)	Turn on ONLY selected STP (Default)
2	Turn on ALL STPs
3	Automatic Mode

Command Code 50: Map Valves and STPs

Command Code 50 provides ability to reverse order of mapped valves and STPs. This option is useful in case the site or an individual dispenser was plumbed backwards. It does not move the association between PPU display position and grade. Use of this code is not recommended for correcting plumbing errors. Pump node replacement will set this parameter to default. Valves and STPs will than be improperly programmed. Default for this option is selection 1, NORMAL.

Note: This Command Code will result in an error display, as described in Dispenser Programming, if attempted on a multi-hose MPD dispenser.

Figure 5-55: Mapping Values and STPs



1 Enter **5**, then **0**, then **ENTER** to access this Command Code.

2 Use the following table to select option (**1-2**).

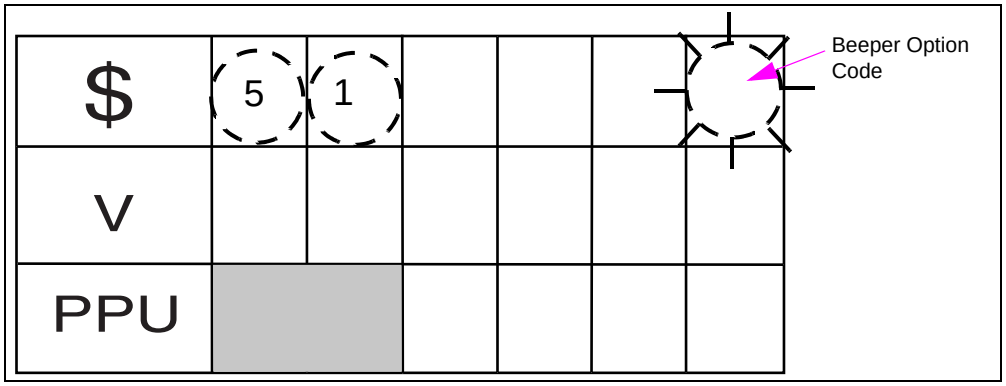
Option	Mapping
1 (Default)	Normal
2	Valves Reversed

3 Press **ENTER**.

Command Code 51: Set Main Beeper

Command Code 51 is entered in Level 2 programming to set beeper functionality. The table below indicates beeper programming options. If beeper option is set to "ON", the beeper will sound when pump handles are lifted, when the dispenser is authorized, and when any pump switches/keypads are activated. Default for this option is selection 1 - beeper "ON".

Figure 5-56: Setting the Main Beeper



1 Enter **5**, then **1**, then **ENTER** to access this Command Code.

2 Use the following table to select option (**1-2**).

Option Code	Beeper
1 (Default)	ON
2	OFF

3 Press **ENTER**.

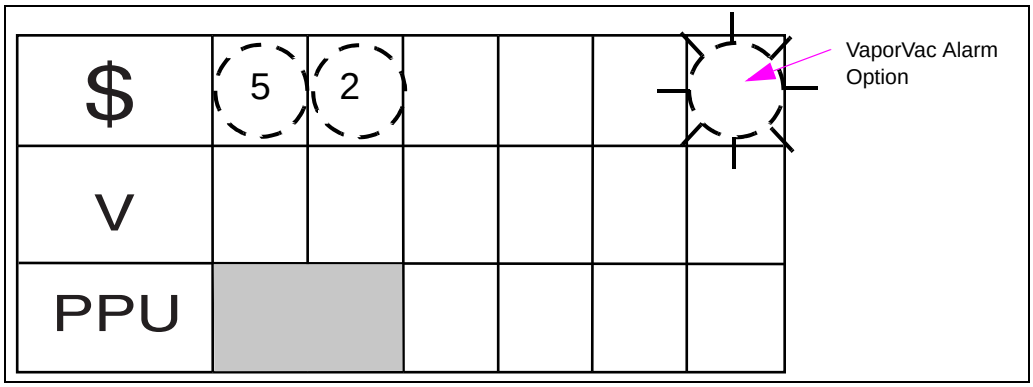
Command Code 52: Set VaporVac Alarm

Command Code 52 is entered in Level 2 programming to set VaporVac alarm functionality. The table below indicates alarm programming options. If VaporVac alarm is set to "ON", the beeper will turn on at a VaporVac error and will not turn off until dispenser has been warm started.

Note: In Mexico, the VaporVac alarm must be set to "ON".

Default for this option is selection 1 - VaporVac alarm "ON".

Figure 5-57: Setting VaporVac Alarm



1 Enter **5**, then **2**, then press **ENTER** to access this Command Code.

2 Use the following table to select option.

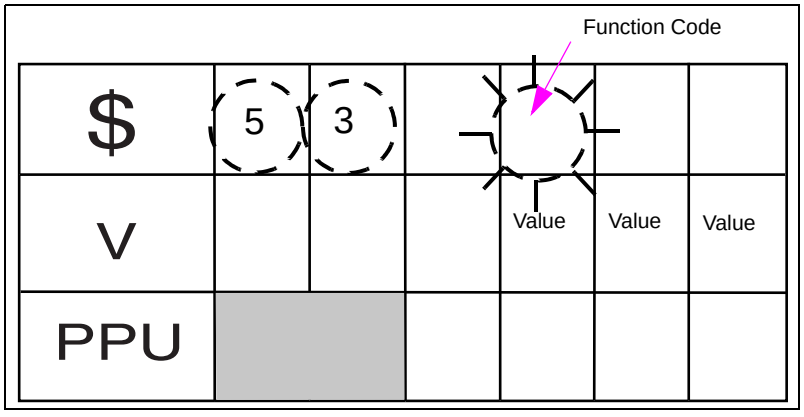
Option Code	VaporVac Alarm
1 (Default)	ON
2	OFF

3 Press **ENTER**.

Command Code 53: Set Time-outs

Command Code 53 is entered in Level 2 programming to set dispenser time-out options. Function Codes 1 through 3 are selected to set various dispenser time-outs. Sub-sections that follow describe each time-out programming option. Entry into Command Code 53 will select Function Code 1 by default. Layout and digit position meaning for this programming feature is shown below.

Figure 5-58: Setting Time-outs

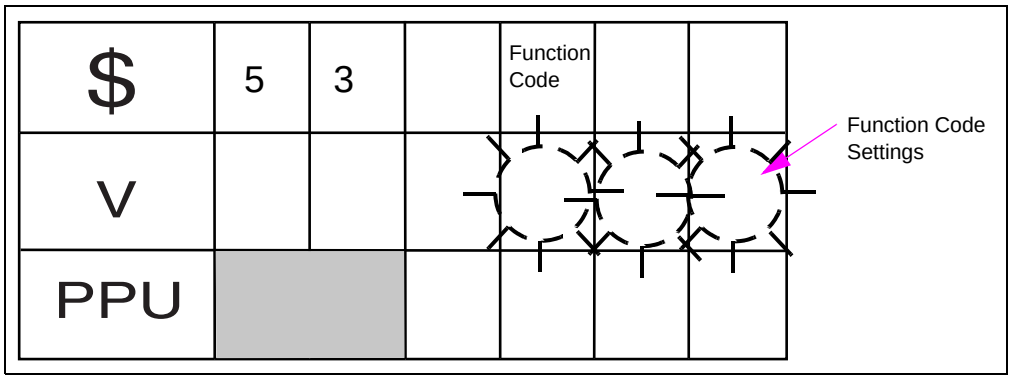


1 Press **5**, then **3**, then press **ENTER** to access this Command Code.

2 Use the following table to select (**1-3**) the Function Code.
Note: Refer to the Function Code Descriptions Function Code Descriptions for Command Code 53 for more information.

Function Code Option	Time-out Option
1 (Default)	Set Beeper Time-out
2	Set Pre-select Time-out (in seconds)
3	Set Dispenser Time-out (in seconds)

Figure 5-59: Function Code Settings



3 Press **ENTER**.

Function Code Descriptions for Command Code 53

Function Code 1: Set Beeper Time-out Value

Option determines amount of time beeper sounds after dispenser time-out has occurred. Allowed range for this time-out is 0 to 999 seconds. Default value is 0 or no beeper. Beeper should sound once a second for the number of seconds programmed.

Function Code 2: Set Pre-Select Time-out

Programming option will set pre-select time-out timer period allowed for cash/credit or grade select buttons to be pressed, before handle is raised for a non-Nozzle-activated unit. Timer starts when dispenser is authorized and times until customer lifts pump handle. Once pre-select time-out has occurred, Cash/Credit and or grade selected is lost and must be re-selected by customer. Pump does NOT change state when this time-out occurs. A zero value means there is no time-out. Pump Preset is also under control of pre-select time-out. Allowed range for this timer is from 0 to 999 seconds. Default value for this function is 15 seconds.

Function Code 3: Set Dispenser Time-out

Dispenser time-out is measured from when pulses STOP flowing, until handle is lowered, to remind driver to remove the nozzle from tank. If Beeper Time-out is enabled and set to a value greater than 0, beeper should beep once a second (until Beeper Time-out timer runs down). Default value for this function is 0 seconds (no time-out).

If fueling is resumed, beeper will stop sounding and timer is reset.

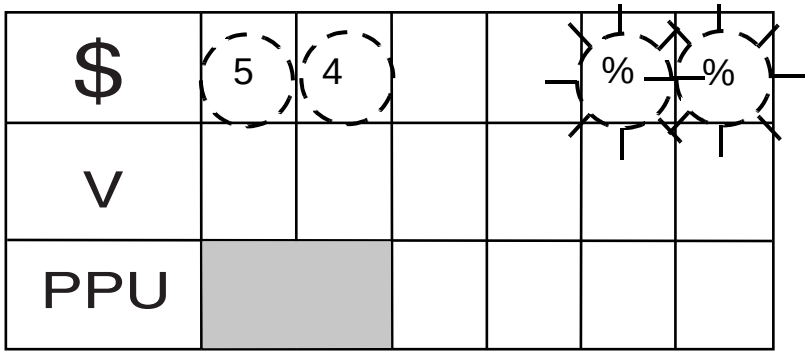
*Note: If this is a nozzle activated (Option 91 Function 12) unit, this value is ignored and treated as if value was set to "0". **NOZZLE ACTIVATED PUMPS (AUTO-ON) SHOULD NOT ALLOW PRE-SELECTION OF GRADE, CASH/CREDIT or PUSH TO START**. Pump Preset can still be pre-selected.*

Command Code 54: Set Slowdown Valve

Command Code 54 is entered in Level 2 programming to determine when dispenser goes into slowdown mode prior to reaching transaction preset value. Programmer enters slowdown value using digit keys. Slowdown value is in terms of a percentage of pulses per unit volume with a default value of 20% (pulses/unit). Range of values is 0 to 99 percent. A value of 0 means no slowdown. Layout and meaning of each digit position for this programming feature is shown below.

This parameter is set to reduce "preset" problems with missed targets. Experimentation is typically required to find a suitable value. It is typically used when multiple units are experiencing preset problems.

Figure 5-60: Setting Slowdown Valve



1 Enter **5**, then **4**, then press **ENTER** to access this Command Code.

2 Select percentage (**0-99**).

3 Press **ENTER**.

Command Code 55: Set Hose Pressurization

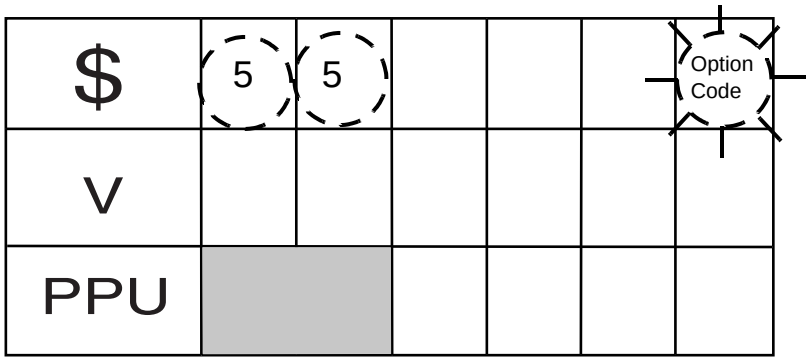
Command Code 55 is entered in Level 2 programming to pressurize hose before dispensing, by not registering flow up to 20 pulses or 1 second, whichever comes first.
Note: This flow will appear on the customer displays.

This option is used in cold climates where fuel in hose may have contracted after a period of inactivity. This could cause what is commonly referred to as 'meter jump' at the beginning of a transaction. Default value is selection 1, "OPTION OFF". This function will pressurize hose during lamp test of first transaction after a power up or during lamp test of first transaction after a period of inactivity defined by programming option code.

Note: Fuel passing through meter during hose pressurization will not be registered on displays nor counted toward the sale prior to start of delivery.

IMPORTANT INFORMATION
Command Code 55 is not intended as a fix for defective equipment such as a leaky meter, meter check valve, nozzle or vapor recovery hoses. Always fix problems first.

Figure 5-61: Setting Hose Pressurization



1 Enter **5**, then **5**, then press **ENTER** to access this Command Code.

2 Use the following table to select option (**1**-**3**).

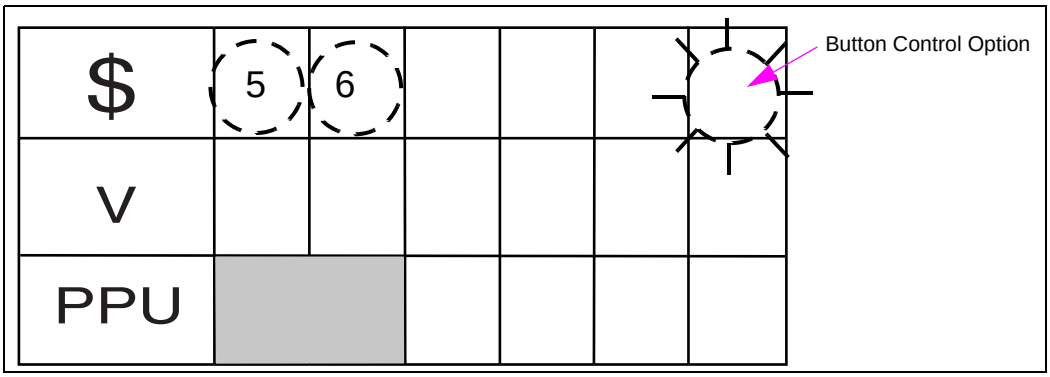
Option	Hose Option
1 (Default)	Option OFF
2	Unit has sat inactive for 10 minutes
3	Unit has sat inactive for 30 minutes.

3 Press **ENTER**.

Command Code 56: Set Stop Button Control

Command Code 56 is entered in Level 2 programming to set stop button control. Programming is allowed but will only be effective if a “STOP” button has been selected as INSTALLED in the Level 4 programming mode. Option 1 means that each STOP button will only stop its own side. Selection two means that either STOP button will stop both sides of dispenser. Default is selection 1 for one side only.

Figure 5-62: Setting Button Control Options



1 Press **5**, then **6**, then press **ENTER** to access this Command Code.

2 Use the following table to select Option.

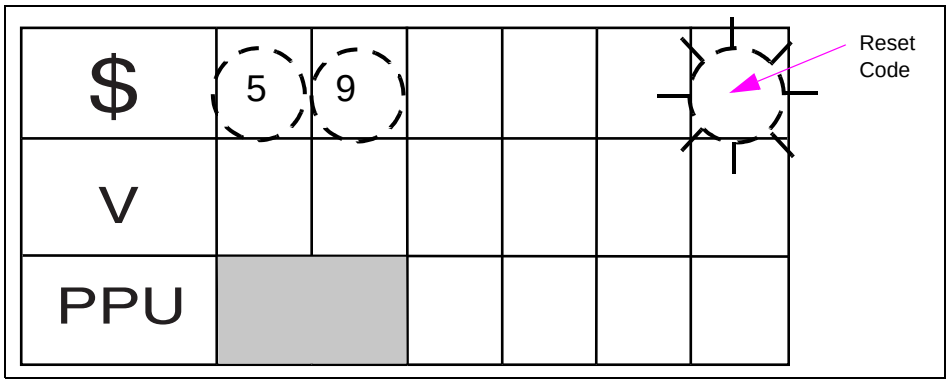
Option	Button Control
1 (Default)	Stop one side only
2	Stop both sides

3 Press **ENTER**.

Command Code 59: System Cold Start

Allows programmer to clear all pump controller application memory and start again. All Level 1 and Level 2 Command Codes are reset to their default (Manufacturing) values. This Command Code is not required to upgrade software. It is to be used only in the event that all other attempts to correct a dispenser problem do not work. This action does not disturb metrological data storage or force a download. Layout and digit position meaning for this programming feature is shown below.

Figure 5-63: Setting the System Cold Start



1 Press **5**, then **9**, then press **ENTER** to access this Command Code.

2 Use the following table to select the Reset option.

0 = Normal (Default)
1 = Cold Start (allow master reset)

3 Press **ENTER**.

*Note: Upon pressing **ENTER,** the unit will perform a cold start. On completion of reset process, the pump will perform a normal lamp test and resume normal operation. All Level 1 and 2 programmed data and the clock will be set to manufacturing default values.*

Command Code 60: Set Clock and Calendar

Settings for time and date programming may be completed from Manager Keypad or sent from console/controller. As a result, dispenser always uses last settings made by either programmer or console/controller. Not setting the correct values may affect reports, closing shifts and dispenser event logs. Properly time stamped event logs are valuable in service situations.

There are two Function Codes applicable to Command Code 60, Function Code 1 for setting time, and Function Code 2 for setting date. Default selection upon entry into Command Code 60 is Function Code 1 for setting time.

Layout and digit positions are show in the following diagram.

Figure 5-64: Layout and Digit Positions for Setting Clock and Calendar

$	6	0				Function Code
V	Month	Month	Day/ Hour	Day/ Hour	Year/ Minutes	Year/ Minutes
PPU						

1 Enter **6**, then **0**, then press **ENTER** to access this Command Code.

2 Set Dispenser Time – **Function Code 1**
Dispenser time is set in 24 hour format. Programmer enters time in terms of hours and minutes. If no prior time programming has been done, time will default to 1200.

Table below shows the display assignments for setting the time.

Main Volume Display
HHMM

3 Set Dispenser Date – **Function Code 2**
Date is programmed by entering month, day, and year in that order. If no prior date has been programmed, default date will be shown as 010100 (January 1, 2000).

Table below shows the display assignments for setting the time.

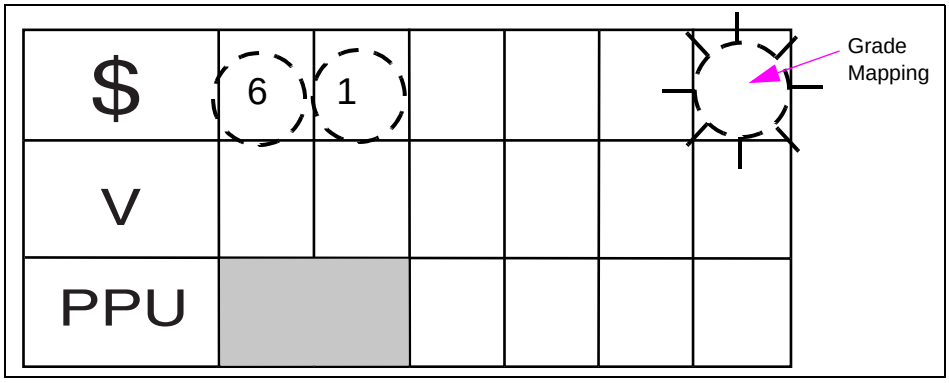
Main Volume Display
MMDDYY

Command Code 62: 2-Wire Remapping Grade

Command Code 62 is used to remap grades of a blender 3+0 configuration onto 2-Wire protocol. Configuration switches grades 2 and 3 of a 3+0 blender to 3 and 5, respectively. Feature is set when dispenser is connected to POS system requiring different grade configuration.

Layout and digit position meaning for this programming feature is shown below.

Figure 5-65: 2-Wire Remapping Grade



1 Enter **6**, then **2**, then press **ENTER** to access this Command Code.

2 Use the following table to select grade mapping options.

Selection	3+0 Blender Grade Mapping
1 (Default)	2-Wire (1-2-3)
2	Other POS System (1-3-5)

3 Press **ENTER**.

Level Three Command Codes

If using pump software V1.7.58 or Higher

In this version of software, the calibration mode is automatically entered when the Weights and Measures switch is toggled. Earlier versions of software allowed you to toggle the programming switch prior to entering the programming mode. Now, you must be in the programming mode prior to toggling the Weights and Measures switch. See "Important Information about Using V1.7.58 and Higher for Encore 5XX and Eclipse Dispensing Pump Software" on page 5-7 for additional information.

To enter Level 3 programming levels with V1.7.58 or higher software for programming purposes (except those for calibration), proceed as follows:

1 Press **F1** on the Manager Keypad.

2 Toggle the Weights and Measures switch to enter the higher level programming.

3 Enter Pin Code for higher level programming when required.

4 When finished programming, turn the Weights and Measures switch off.

5 Press **F2** to exit programming.

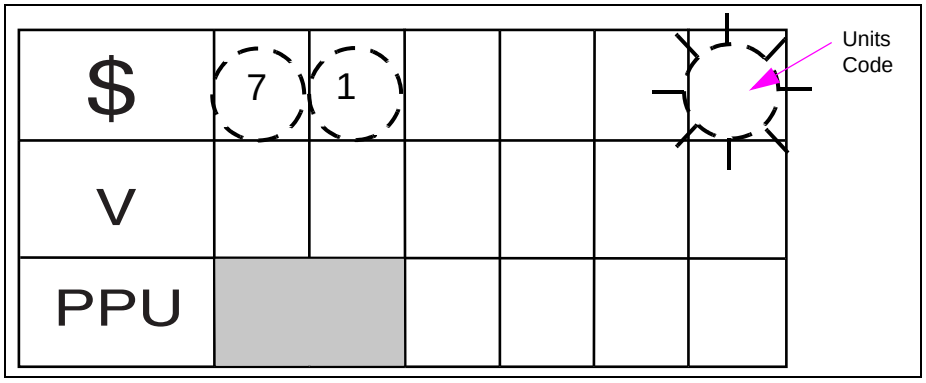
If the pump uses software prior to V1.7.58

You must toggle the Weights and Measures switch prior to entering the programming mode.

Command Code 71: Set Volume Units

Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-66: Setting Volume Units



1 Enter **7**, then **1**, then press **ENTER** to access this Command Code.

2 Select volume unit code (**1**-**3**)

Volume Units Code	Unit Type
1 (Default)	U.S. Gallons
2	Liters
3	Imperial Gallons

3 Press **ENTER**.

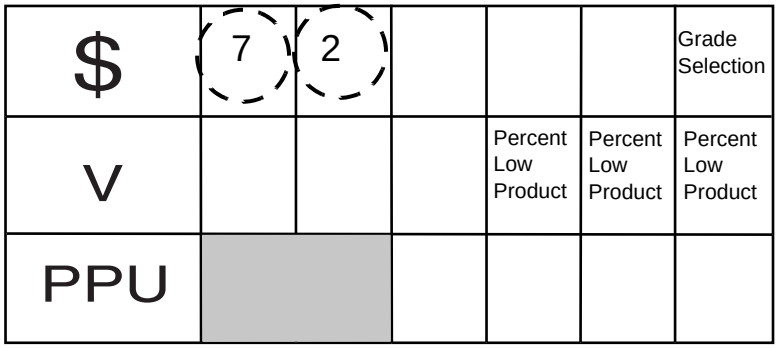
Command Code 72: Set Blend Ratios

Set blend ratios allows programmer to program all blend ratios for all grades that can be blended according to dispenser type. Only blend programming for grades that can be blended is allowed. Thus, non-blended grades are treated as pure, 100%, products. Valid entries for percent figures are from 0 to 100. Entries above 100 will result in a programming error condition as described in the pump programming section. Default value is 120.

*Note: There is no default value for blend ratios and as a result, programmable ratios **must be programmed before the dispenser will operate**. Un-programmed blend ratios will appear as flashing 888 for each product.*

Layout and digit positions are shown in the following diagram.

Figure 5-67: Setting Blend Ratios



1 Enter **7**, then **2**, then press **ENTER** to access this Command Code.

2 Select Grade (**1** to **6**).

Grade Selection	Low Product Blend Percentage
1-6	0 to 100

3 Select percent low product (**0**-**100%**)

4 Press **ENTER**.
*Note: No Default - **MUST** be programmed.*

Command Code 73: Set/Display Money Totals

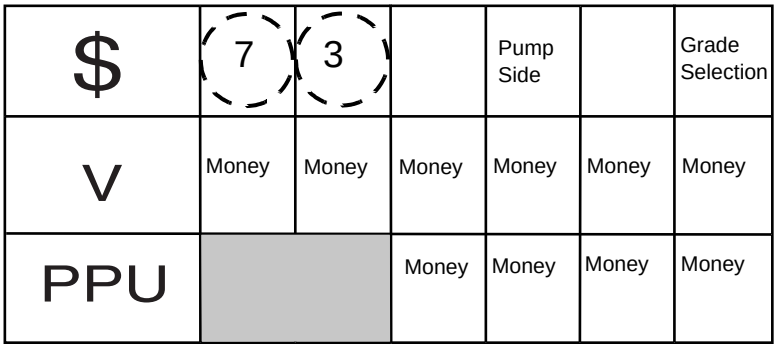
Allows programmer to read and set money totals. Initially, displays will show zeros in all locations.

Note: This function can only be performed at first initialization of dispenser and before total flow exceeds 250 volume units.

Once totals of a grade reach 250 volume units, they cannot be reset. Only grades used in dispenser will accept money totals. Note that position of decimal point in totals values will depend on prior programmed location of decimal point in dispenser display. Layout and meaning of each digit position for this programming feature is shown below.

Layout and digit positions are shown in the following diagram.

Figure 5-68: Money Totals Display



1 Enter **7**, then **3**, then press **ENTER** to access this Command Code.

2 Select Side (**1** or **2**), then press **ENTER**.

3 Select Grade (**1** to **6**), then press **ENTER**.

4 Set or Display Money Total.

5 Press **ENTER**.

Command Code 74: Set/Display Volume Totals

Allows programmer to read and set volume totals. Initially, for a new pump controller board, displays will show zeros in all locations.

Notes:1) Function can only be performed at first initialization of dispenser and before total flow exceeds 250 volume units.

Once totals of a grade reach 250 volume units, they cannot be reset. Only grades used in dispenser will accept volume totals.

2) Position of decimal point in totals values will depend on prior programmed location of decimal point in dispenser display.

Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-69: Volume Totals Display

$	7	4		Pump Side		Grade Selection
V	Volume	Volume	Volume	Volume	Volume	Volume
PPU			Volume	Volume	Volume	Volume

1 Enter **7**, then **4**, then press **ENTER** to access this Command Code.

2 Select Side (**1-2)** and then press **ENTER**.

3 Select grade (**1-6**: up to 8 for blenders), and then press **ENTER**.

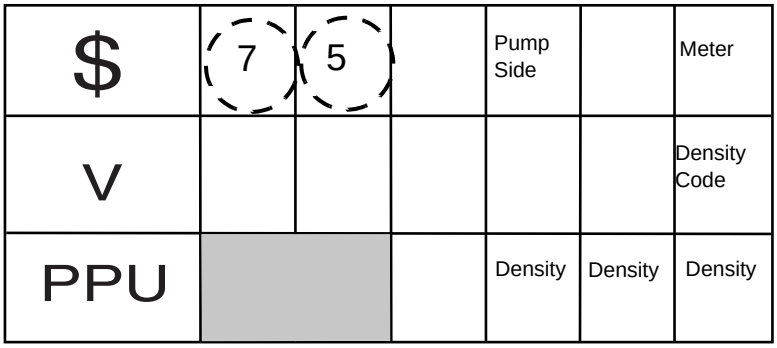
4 Set or Display Total.

5 Press **ENTER**.

Command Code 75: Set Fuel Density (ATC and VaporVac Only)

Allows programmer to set density of fuel to be dispensed under ATC. Values can be set to 730 for gasoline and 840 for diesel fuel. Only the number of meters that exist (sensed by dispenser controller software) are shown. Once in this mode, meters can be cycled by repeatedly pressing **ENTER**. Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-70: Setting the Fuel Density



1 Enter **7**, then **5**, then press **ENTER** to access this Command Code.

2 Select side (**1**-**2**), then press **ENTER** to accept side.

3 Select meter, the press **ENTER** to accept meter.

4 Select density (**1** or **2**).

Density Codes	Fuel Density
1 - gasoline (Default)	730
2 - diesel	840

5 Press **ENTER** to accept density.

The table below shows the allowed fuel densities.

Deactivating VaporVac Pumps for Diesel Pumping in CC75

VaporVac motors do not need to run when dispensing diesel products. Motors can be set not to run when diesel is pumped using this Command Code. The default setting for Encore and Eclipse units with VaporVac is all products turn vapor motors on.

In order to dispense a product without turning on VaporVac motor (for example, diesel), proceed as follows while in Command Code 75:

1. Select meter (see following illustration for meter locations).
   Note: Selecting a meter automatically sets the density for the corresponding meter on the opposite side for that product.

2. Press **ENTER**.

3. Select density.
   Note: Selecting 2 (diesel) will deactivate VaporVac pump for that meter.

Command Code 77: Change PIN Code

PIN Codes are a security feature. Changing PIN Codes from default can enhance station security. Revised PIN Codes should be safely stored by the station and ASC such that they can be accessed as necessary. They must not be misplaced or lost because a “cold cold start” is required to reset the code. Or revert to V1.3.74 or earlier software, reload the latest version software, and then reprogram.

*Note: PIN Code **must** be entered twice.*

This Command Code allows the programmer to set new PIN Codes for entry into the four different programming levels. When accessed, all codes are shown as "- - - -". Entering new digits for new codes changes the display, as they are entered. Display does not show actual PIN digit, but shows a ‘0’ to denote that a number was entered. Same PIN Code must be entered twice for it to be allowed.

First pass at entering a PIN Code is signaled by a “1” displayed in the Pass Code display. Second pass is signaled by a “2” appearing in the Pass Code display. Acceptance of a PIN Code is signaled by a “3” appearing in the Pass Code display. A zero in the Pass Code display indicates the PIN Code was not accepted.

Four Function Codes are provided for changing each programming level PIN Code. All Function Code/PIN Code change operations have identical procedures. Default selection upon entry into Command Code 77 is for Function Code 1 – change level one PIN Code. Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-71: Changing the PIN Code

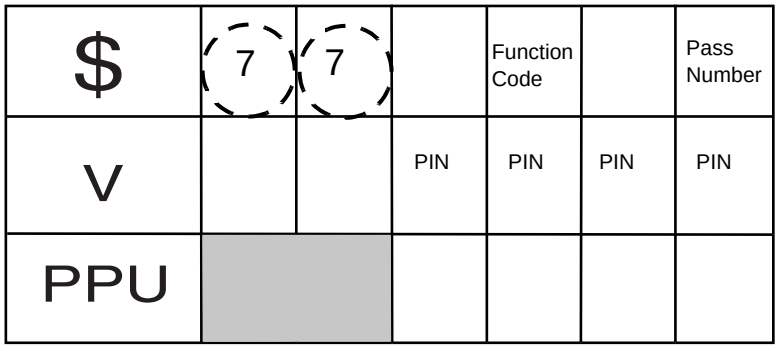


Table below shows the Function Codes available for this Command Code.

Function Code	Option
1 (Default)	Change PIN Code - Level 1
2	Change PIN Code - Level 2
3	Change PIN Code - Level 3
4	Change PIN Code - Level 4

1 Enter **7**, then **7**, then press **ENTER** to access this Command Code.

2 Program/assign new PIN Code.

3 Press **ENTER** to accept new PIN Code.

Change PIN Codes – Function Codes 1- 4

PIN Code levels correspond to Function Codes in Command Code 77. Thus, Function Code 1 for Level 1, 2 for Level 2, and so on. Note that all PIN Code assignments work the same.

Keypad Programming: New PIN Code

- Select Level (1-4) for code change.

Notes:1) If Level 1, no selection necessary. Level 1 is Default.

- ENTER – accept level PIN Code for change.
- Enter PIN Code.
- ENTER **–** complete first pass, pass number now shows 2.
- Re-enter PIN code.
- ENTER **–** complete second pass.

*2) If pass number display shows value of "0", it indicates that first and second PIN Code entries did not agree. Press **F1** to start PIN Code entry sequence from the beginning. If the new code is entered correctly twice, pass number display will display a value of 3 to indicate acceptance of new PIN Code.*

Electronic Calibration

WARNING

You are working in a potentially dangerous environment of flammable fuels/vapors and high voltage.

Fuel and its vapors may ignite, leading to serious injury or death. Fire, explosion or electrical shock could result in severe injury or death if you do not follow safe procedures.

Surfaces of Eclipse Series units are non-metallic. Magnetic-backed keypads will not adhere to Eclipse unit surfaces as they will to others. In any situation where power is on and gasoline and its vapors are present or potentially present (for example, calibration), do not attempt to use Manager Keypad with electronics cabinet open.

When calibrating Eclipse units, run keypad cable over door and close door, allowing keypad to be suspended on unit and accessed from outside for all procedures done with power applied or where there is a possibility of fuel or fuel vapor presence.

All meters must be calibrated before the dispenser functions. If unit is a blender where the percentage for low grade product is not 0% or 100% for high grade product, you must temporarily set the blend to 100% for the low grade product meter or 0% for high grade product meter. If all meters are not calibrated, dispenser will display “Not Calibrated” error code when the dispenser is placed in normal mode.

CAUTION

Before you proceed, read and understand “Purging Air from the System” on page 7-7 in the Hydraulic Components section of this manual. Operating unit with air in the system can cause damage to meter from overspeed.

The unit must be properly configured to CC71 before calibration. After completing calibration, the Weights and Measures switch must be sealed per local authority. All replacement meters must be calibrated after installation and testing.

Figure 5-72: Manager Keypad

Calibration procedure requires that each parameter be entered before advancing to next procedure step. If a parameter is not entered, dispenser/display will wait until parameter is entered. Entries are not checked for errors and are thus accepted and used as entered by programmer. Entry into meter calibration will default to Side 1 with no units programmed by default.

Layout and digit position is shown in the following diagram.

Figure 5-73: Layout and digit position Display

$	Com-mand Code	Com-mand Code	Can Size	Can Size	Can Size	Pump Side
V	Volume	Volume	Volume	Volume	Volume	Volume
PPU				Units Code	Meter Number	Under Over

For information on diagnosing calibration problems, refer the "Troubleshooting" on page 8-28 section of this manual.

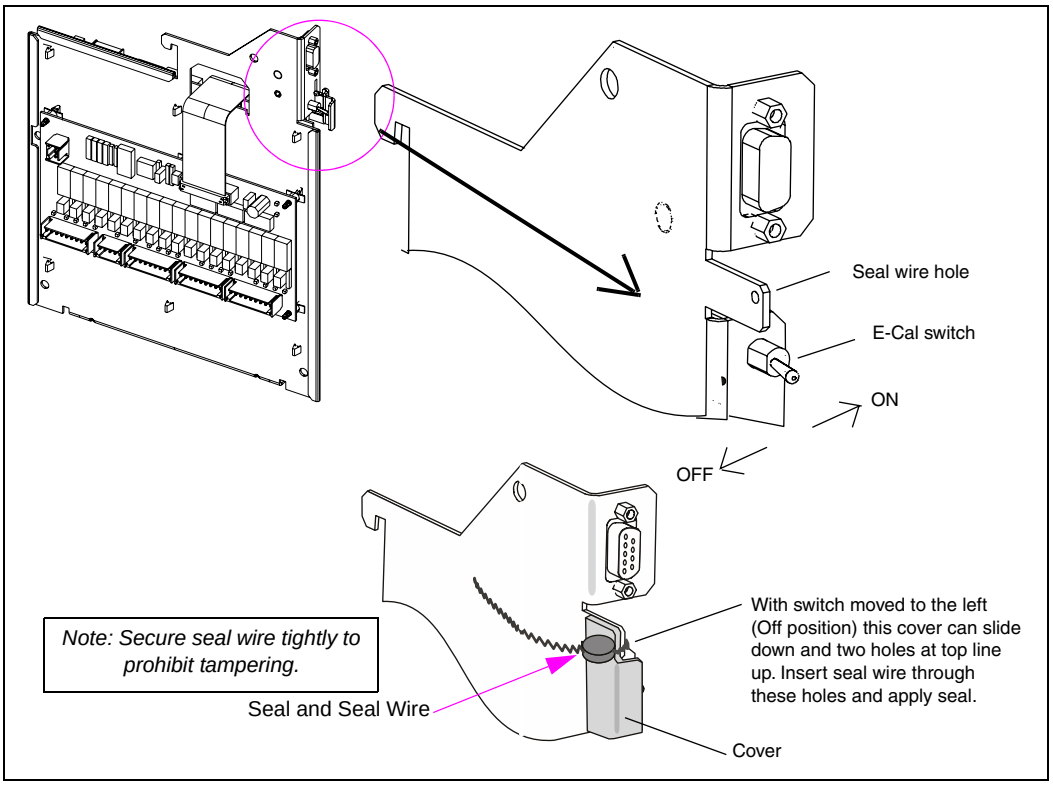
Pump software V1.7.58 and higher for Encore 5XX and Eclipse contains enhancements to simplify the meter calibration verification and calibration process. It is no longer necessary to run a separate verification process to determine if meter is properly calibrated and then run a separate calibration setting if so required.

With This Version Pump Software	Refer To
V1.7.58 or higher	"Enhanced Meter Calibration and Audit" section on page 5-74
Prior to V1.7.58	"Standard Meter Calibration Procedure (Pre-V1.7.58 software)" section on page 5-79

After completing calibration, the Weights and Measures switch must be sealed per local authority. All replacement meters must be calibrated after installation and testing.

Install the updated software to take advantage of the enhancements.

Figure 5-74: Weights and Measures Switch


Seal wire hole
E-Cal switch
ON
OFF
With switch moved to the left (Off position) this cover can slide down and two holes at top line up. Insert seal wire through these holes and apply seal.
Note: Secure seal wire tightly to prohibit tampering.
Seal and Seal Wire
Cover

Enhanced Meter Calibration and Audit

Pump software V1.7.58 for Encore 5XX and Eclipse with C+ meters contains enhancements to simplify C+ meter calibration and provides the capability for Weights and Measures audit trail. It is no longer necessary to run a separate verification process to determine if meter was previously calibrated and then run a calibration process if so required.

IMPORTANT INFORMATION

To ensure accuracy for pump software V1.7.58 and higher, it is **Very Important** that the filling of the prover be accurate and within +/- 1 cubic inch of the zero reading. If the calibrator fails to stop flow within this limit, then the calibration process must be repeated.

For more information refer, "First Time Meter Calibration Procedure" on page 5-75 and "Combined Verification and Calibration Procedure" on page 5-77.

Set-Up

Calibration can be performed in Standalone mode or via console control operation.

If the unit volume type is programmed to gallons, the prover can size will default to 5 gallons and if programmed to liters, the default is 20 liters. If a different size prover can is being used, it can be programmed in CC82. This can size will be retained in memory.

If the Volume Unit Type (VUT) or blends are required to be programmed, the programming mode is entered in the normal manner except that the calibration switch must be turned “ON” after entering the programming mode and turned “OFF” before exiting the programming mode to save the changes.

Special Considerations for V1.7.58 software:

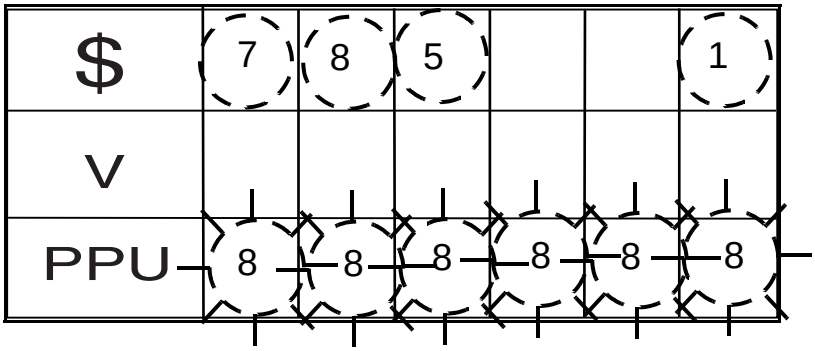
- Error Code 26 will not clear automatically after calibrating meter. A warm start is now required.
- When performing the combined verification and calibration, the electronic totals will be increased as during a normal sale.
- When performing the first time calibration procedure, the totals are not updated.

First Time Meter Calibration Procedure

This calibration process is most commonly used for units not already calibrated. Factory pre-calibration must be verified.

1 Move cover to expose the Weights and Measures switch. See Figure 5-74 on page 74. Flip the switch to “ON”, turning on the main display on both sides of the unit. The PPU shows the number of days that have lapsed since the last calibration. If this meter has not been verified or calibrated before (factory pre-calibration is not counted), the PPU displays flashing 8s.

Figure 5-75: PPU Display



2 Setting the prover can size and VUT:

- The three Most Significant Digits (MSDs) of the money display contains the prover can size, which is 5 gallons in this case.
- The Least Significant Digit (LSD) of the money display shows the volume unit type: 1= U.S. Gallons and 2 = Liters. Option 1 is shown in this case.

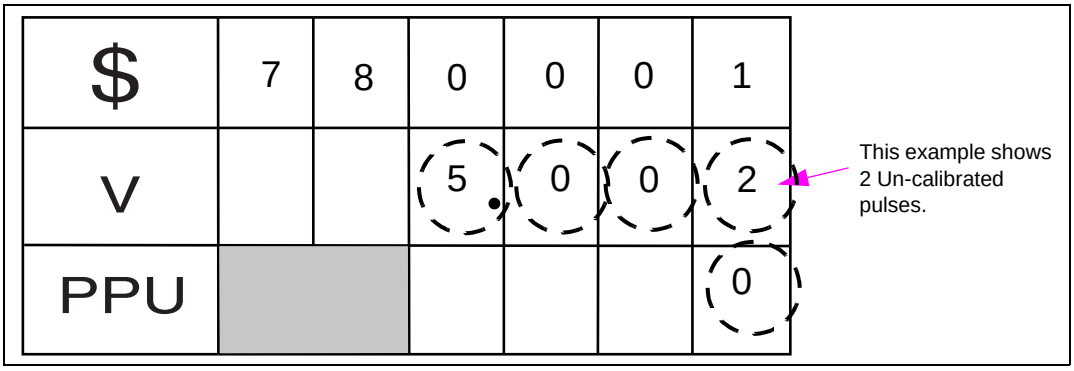
If the VUT or blends have not been programmed, the PPUs will flash 26 for “No VUT” and/or 4307 for “No Blends”.

If the prover can size is not as shown, refer to CC82 instructions. You must turn off the Weights and Measures calibration switch before changing CC82 can sizing.

3 Remove nozzle and select pure product (grade) by raising the pump handle or removing the nozzle and pushing the grade select button of the meter to be calibrated.
Note: All PPUs except for the one associated with the meter being calibrated will be blank.

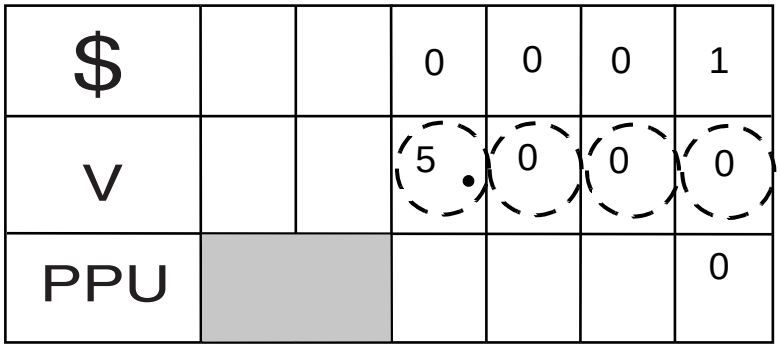
4 Dispense fuel into the appropriate prover can, ensuring that you stop within +/- 1 cubic inch. If the calibrator fails to stop flow within this limit, then the calibration process must be repeated.

Figure 5-76: 2 Un-calibrated pulses



5 Lower the handle or replace the nozzle and the volume display changes to the programmed prover can value. This meter is now calibrated and the volume display shows the amount corresponding with the prover can size.

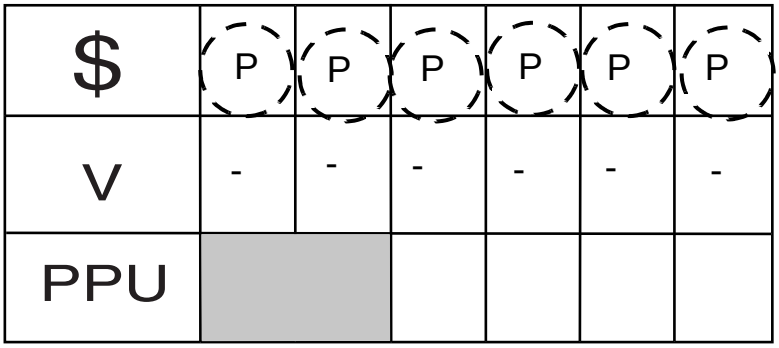
Figure 5-77: Meter Calibration



6 If other meters must be re-calibrated, repeat steps 2 through 5 for each meter. It is not necessary to re-enter prover can size and VUT information after each meter calibration. This allows calibration of both sides of the unit without returning to the Manager Keypad.

7 After all the meters are calibrated, flip the Weights and Measures switch to the “OFF” position. When the switch is placed in the “OFF” position, the new calibration values are first saved to redundant data storage. The Money display shows “PPPPPP” and the volume display shows “------”, and then returns the unit to normal operation.

Figure 5-78: Flipping the Switch



8 Install seal wire and apply seal as determined by the governing authority.

Combined Verification and Calibration Procedure

This alternate approach is for all units previously calibrated at some point in time. Prior to this enhancement, the technician had to run a verification test to determine if re-calibration was required and run through the calibration process if the meter needed re-calibration.

If the technician or Weights and Measures official is checking calibration, then 5 gallons (20 liters) are dispensed into the prover can, stopping at the zero mark on the can. Compare the prover can size and the displayed amount and use the appropriate set of instructions:

Main Display and Prover Can Match

If the pump displays the amount in the can, plus or minus one cubic inch, then that meter is within tolerance and you can move to the next meter.

Main Display and Prover Can do not Acceptably Match

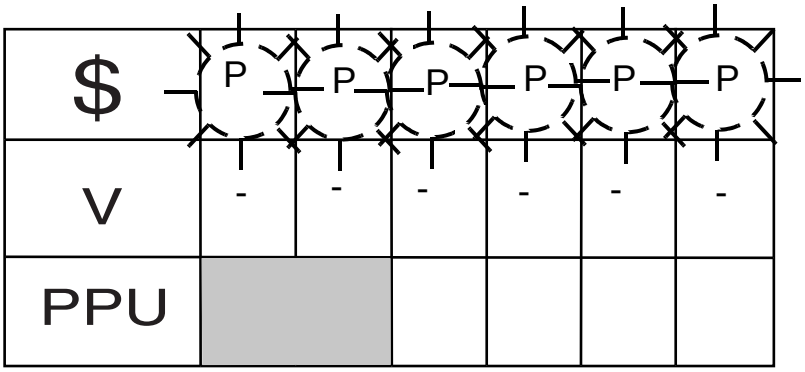
1 **STOP** - Do not lower the pump handle or replace the nozzle at this time but continue on to the following procedures.

2 Cut the seal wire on the calibration switch and switch to the “ON” position, wait for confirmation (2 beeps) and then switch back to the “OFF” position and wait for confirmation (2 beeps).

3 After lowering the pump handle or replacing the nozzle, the money display will flash “PPPPPP” and the volume display will show the volume in the prover can for 2 seconds, before saving the new calibration value in storage.

Note: The display then returns to the transaction value that was displayed before the calibration procedure was performed.

Figure 5-79: Meter Calibration and Verification



4 No other transaction can be active on the other side of the unit during this procedure. The unit will not go into calibration mode if more than one pump handle is activated.
Note: The CRIND may reboot during this procedure.

5 This meter is now calibrated.
Note: Electronic and electromechanical totals are updated when this method is used.

Audit Trail Feature

While in the calibration mode of operation, pressing **ENTER** on the Manager Keypad the specified number of times (as listed in the following steps) will display data described in the "Audit Table Descriptions" on page 5-79.

1 To access the audit feature, place the unit in normal mode of operation, press **ENTER** on the Manager Keypad as shown here.
- 4 times for a blender
- 3 times for a non-blender

2 The displays now show information conforming to the audit trail for the associated meter. Refer to "Audit Table Descriptions" on page 5-79.

3 Press **CLEAR** on the Manager Keypad to return to normal operation.

Audit Table Descriptions

	Press ENTER	Unit Type 1-7	Unit Type 8-9	Unit Type 12-19
X1	Money Display	N/A	BC	BC
	Volume Display	VUTC	VUTC	VUTC
	PPU Displays	DLC	Blend Ratio	Blend Ratio
X2	Money Display	N/A	BC	BC
	Volume Display	VUTC	VUTC	VUTC
	PPU Displays	CT	DLC	DLC
X3	Money Display	N/A	BC	BC
	Volume Display	VUTC	VUTC	VUTC
	PPU Displays	PPVUT	CT	CT
X4	Money Display	No Change	BC	BC
	Volume Display	No Change	VUTC	VUTC
	PPU Displays	No Change	PPVUT	PPVUT
Legend	BC = Total times blends have been changed			
	CT = Total times associated meter calibrated			
	DLC = Days since last associated meter calibration			
	PPVUT = Pulses per VUT for associated meter			
	VUTC = Total time VUT changed			
	VUT = Volume Unit Type (liters or US gallons)			

Standard Meter Calibration Procedure (Pre-V1.7.58 software)

The calibration procedure assumes that either a 5 gallon or 20 liter prover can will be used. If another size can is used, you must change the default can size in Command Code 82. As the new can size will be stored in memory for future calibrations, if the special can size is not likely to be used for the next calibration, it is very important to reprogram the can size back to default after completing calibration. It is also wise to verify the can size on the money display during calibration.

Error code 26 will not clear automatically after a unit has been first calibrated. A warm start is now required. This will be primarily noted after installing a new service board and calibrating or performing a true cold start (drop back to V1.3.74 Pump Node software and then reload to the current version) where re-calibration is required.

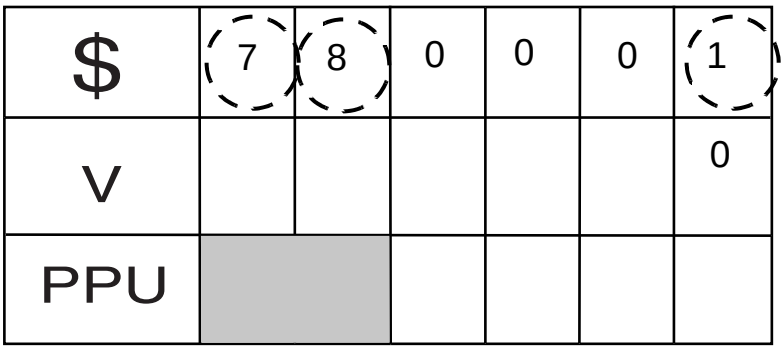
When performing the combined verification test and re-calibration, electronic and electro-mechanical totals will increase as during a normal sale.

Note: Use this calibration procedure for units with pump software prior to version V1.7.58.

1. Prior to entering Command Code 78, the Weights and Measures switch must be turned “ON”. See Figure 5-74 on page 5-74.
2. On the Manager Keypad (Figure 5-72 on page 5-72), press **1**.
3. Press **0128**, then **ENTER**.
4. Press **78**, then **ENTER**.

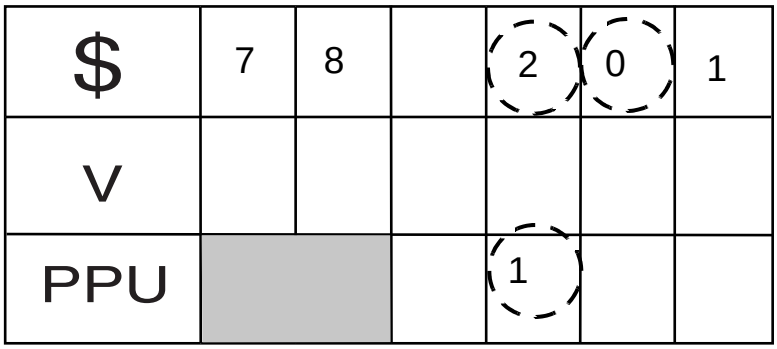
The following example shows Command Code 78 and unit side 1.

Figure 5-80: Command Code 78 and Unit Side 1



5 Insert prover can size. The default value is “0”. It is necessary to enter a volume from 1 to 999 to proceed on to the next step. In this example, the prover can size is 20 US gallons. Current volume unit is selected in CC71 and reported in the Unit Code field, shown as 1 in the following example.

Figure 5-81: Current Volume Unit Reported in the Unit Code Field

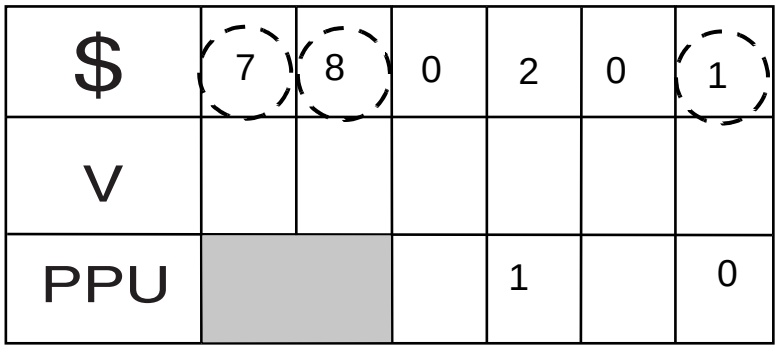


This reference table show the volume units and their codes.

Prover Can Volume Units	Unit Codes
No Units Programmed (Default)	0
U.S.Gallons	1
Liters	2
Imperial Gallons	3

6 Press **ENTER** to accept the default or press **2** to select for side 2. Then insert the calibration side. Default value is 1, as shown below.

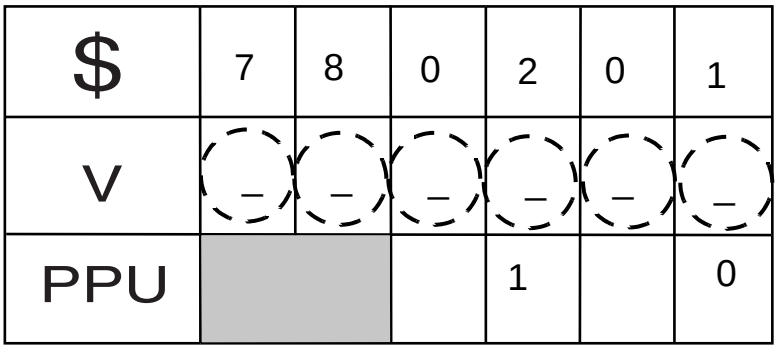
Figure 5-82: Inserting the Calibration Side



To Select This Side	Complete This Action
1 (Side A)	Press **ENTER** (default setting)
2 (Side B)	Press **2** on Manager Keypad, then press **ENTER**

7 Activate the fueling position. The volume display shows all dashes to indicate that the pump is ready to start dispensing fuel.

Figure 5-83: Volume Display Showing Dashes

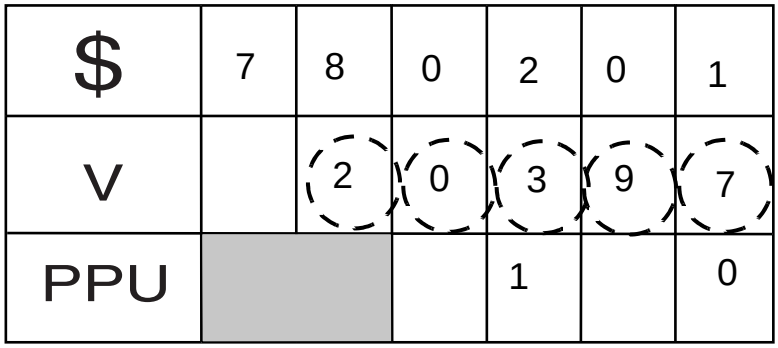


8 Fill the prover can to within +/- 1 cubic inch of the 0 mark. Return the pump handle to the "OFF" position when done.

Note: For blenders, calibration can be performed only on pure product grades (ratio 100 or 0 percent). A double beep sound will signal an incorrect grade selection.

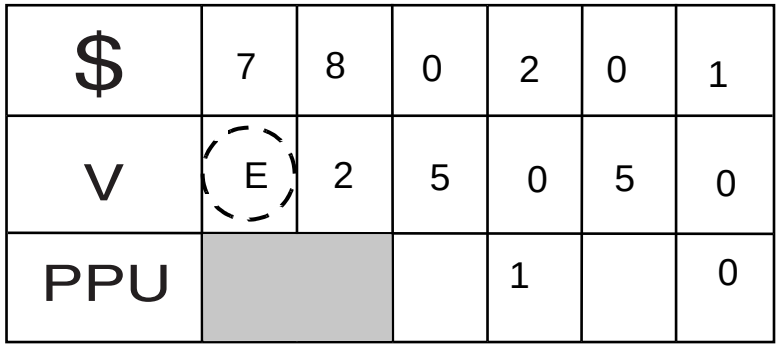
During the fuel dispensing process, real-time raw pulses are shown in the Volume display area. See the following example Figure 5-84 on page 5-82.

Figure 5-84: Real-time Raw Pulses Shown in the Volume Display



Final raw pulses are shown until **ENTER** is pressed. Pressing any other key will signal error by sounding a double beep. If an error occurs during this phase, it will be accompanied by "E" on the volume display.

Figure 5-85: Error Shown on Volume Display



9 The display field is the Volume field. Enter the overflow or underflow value from reading the scale on the prover can. Unit volume is expressed difference, as shown in the following table.

Prover Can Volume Units	Difference Volume Units
Liters	Millimeters
US gallons	Cubic Inches
Imperial gallons	

Figure 5-86: The Display Field is the Volume Field

$	7	8	0	2	0	1
V	0	0	0	0	5	0
PPU				1		0

IMPORTANT INFORMATION

The procedures in **Step** 14 pertain to dispensers that have **software version 1.5.40 or later.**
The procedures in **Step** 15 pertain to dispensers that have **software version prior to 1.5.40.**

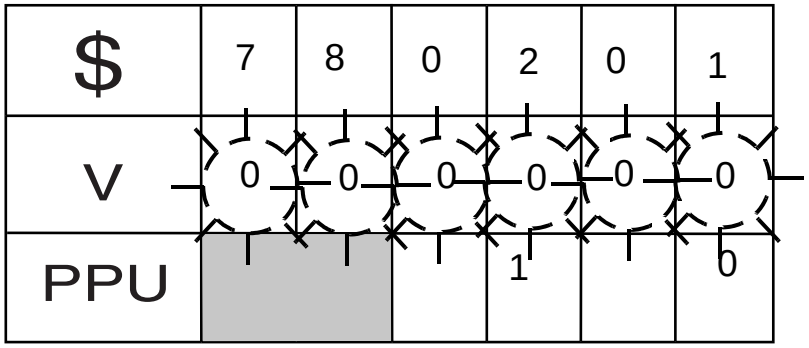
10 **If the dispenser has software version 1.5.40 or later**: In this example, 12 is the number of cubic inches read as over from the prover can. Enter **12** on the keypad to show up in the display as shown.

Figure 5-87: Entering on the Keypad

$	7	8	0	2	0	1
V					1	2
PPU				1		0

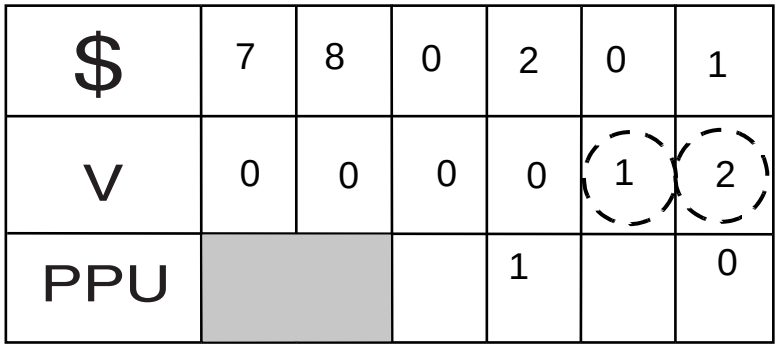
11 **If the dispenser software version is prior to 1.5.40**: In this example, all zeros are flashing in the volume field.

Figure 5-88: Zero Flashing in the Volume Field



12 Enter the offset number (number of cubic inches or centimeters away from zero).

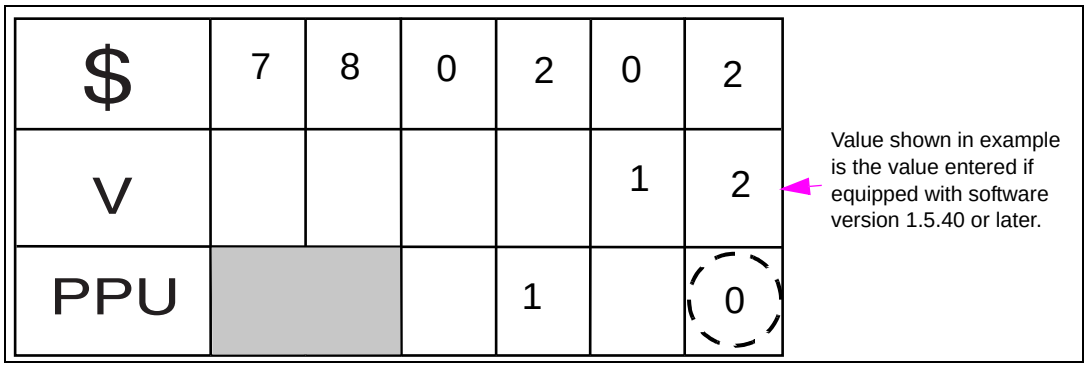
Figure 5-89: Entering the Offset Number



13 Press **ENTER**. Upon entering the overflow or underflow amount, the selection field will move to the underflow/overflow designation field, as shown in the following example. Use the following table to select the correct offset.

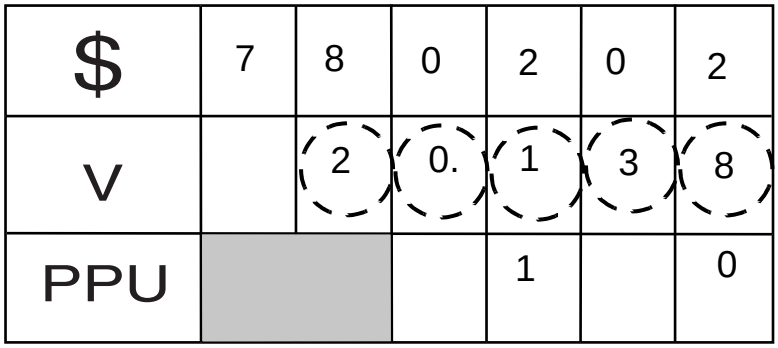
If Reading On Prover Can Is An	Indicated By a Reading	Enter This On Keypad
Overflow	above 0 (plus)	0
Underflow	below 0 (minus)	9

Figure 5-90: Underflow/Overflow Designation Field



14 Press **ENTER**. On pressing **ENTER**, the volume that should be in the can is shown on the display. Compare this reading to the actual volume in the prover can.
Note: If figures do not match, then a number was entered incorrectly or the wrong offset code was used (0.004 gallon = 1 cubic inch).

Figure 5-91: Can Volume Shown in the Display



15 Accepting/rejecting the indicated amount:
- To reject the displayed amount, press **CLEAR**. The selection field will then move back to the Volume field and allow re-entry of the overflow/underflow amount.
- To accept the displayed amount, press **ENTER** again. The selection field then moves back to the side selection in the main money display.

16 The dispenser now calculates the calibration factor based on the internal pulse count of the dispenser test volume and overflow/underflow amount. The meter is now calibrated.

F1 allows additional programming or **F2** may be used to exit programming. **F1** and **F2** will operate only if the security switch has been set to the secure position (“OFF”). Else, calibration mode cannot be exited.

Command Code 80: Set Maximum Flow Rate

Option allows user to select maximum flow rate allowed per Grade. If flow rate value entered is larger than hydraulics maximum capable flow rate, maximum hydraulic flow rate will flow. Default value flow rate is 10 Gallons Per Minute (GPM) per Grade for US and 40 Liters Per Minute (LPM) per Grade for Europe.

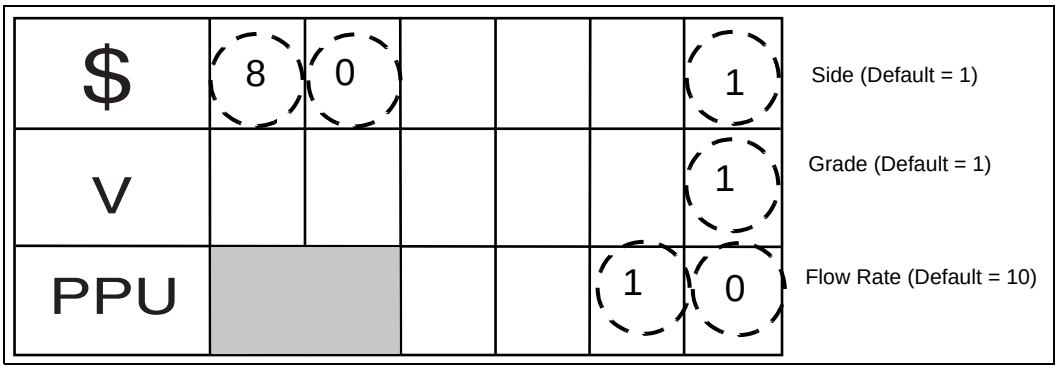
This function only works properly with proportional flow control valves. It does not work properly with digital valves.

The table below shows available options for this Function Code.

Selection	Option
1 or 2	Side
1 - 6	Grade
01 - 98	Flow: units per minute/grade

Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-92: Layout and Digit Position for the Programming Feature



1 On the Manager Keypad press **8**, then **0**, then **ENTER**.

2 Select Side (**1** or **2**), then press **ENTER**.

3 Select Grade (**1** to **6**), then press **ENTER**

4 Select Flow Rate (**01 to 98**) (Default = 10), then press **ENTER**.

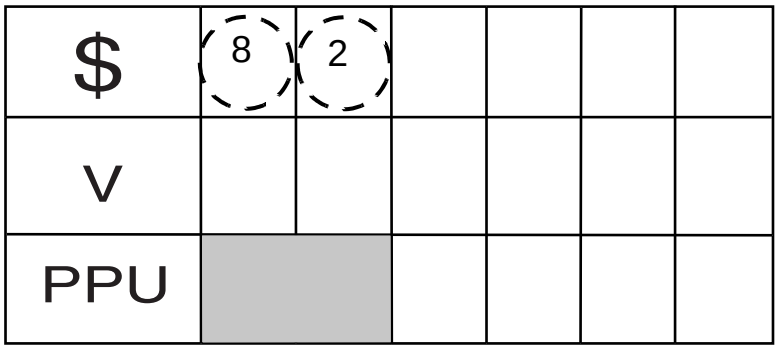
Command Code 82: Setting Prover Can Size

Command Code 82 is used with pump software version V1.7.58 and higher.

Prover can size is set to default to a preset number based on the type of volume units entered. Refer to the following table for those defaults. Command Code 82 is used if an unusual prover can size is required. If changing the Volume Unit type, enter the programming mode in the usual manner, except that the Weights and Measures calibration switch must be turned “ON” before entering CC82 and switched “OFF” before exiting this programming mode to make the changes effective.

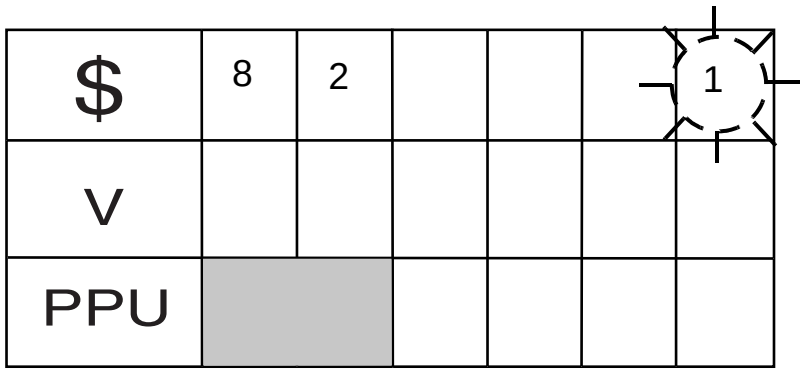
If Volume Unit Is Set To	Prove Can Size Defaults To
US gallons or Imperial gallons	5 gallons
Liters	20 liters

Figure 5-93: Setting Prover Can Size



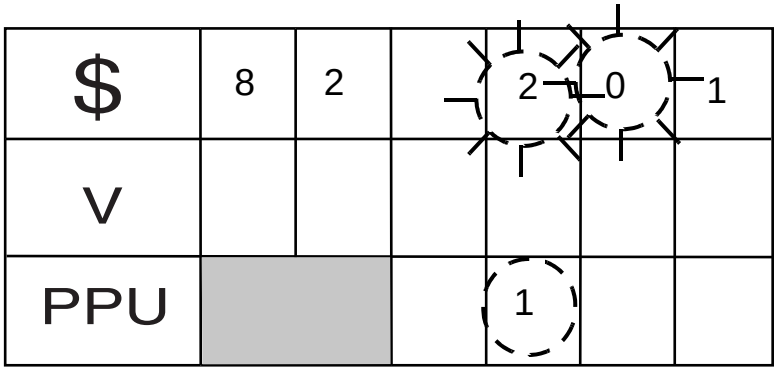
1 The following example shows Command Code 82 and unit side 1.

Figure 5-94: Command Code 82 and Unit Side 1



2 Insert prover can size. The default value is “0”. It is necessary to enter a volume from 1 to 999 to proceed to the next step. In this example, the prover can size is 20 US gallons. Current volume unit is selected in CC71 and reported in the Unit code field, shown as “1” in the following example.

Figure 5-95: Inserting Prover Can Size



This reference table shows the volume units and their codes.

Prover Can Volume Units	Unit Codes
No Units Programmed (Default)	0
U.S.Gallons	1
Liters	2
Imperial Gallons	3

3 Press **ENTER** to accept the default or press **2** to select for side 2. Then, insert the calibration side. Default value is “1” as shown below.

Level Four Command Codes

If using pump software V1.7.58 or Higher

In this version of software, the calibration mode is automatically entered when the Weights and Measures switch is toggled. Earlier versions of software allowed you to toggle the programming switch prior to entering the programming mode. Now, you must be in the programming mode prior to toggling the Weights and Measures switch. See "Important Information about Using V1.7.58 and Higher for Encore 5XX and Eclipse Dispensing Pump Software" on page 5-7 for additional information.

If the pump uses software prior to V1.7.58

You must toggle the Weights and Measures switch prior to entering the programming mode.

Level 4 provides configuration level commands that are performed by the factory to initialize dispenser and configure software to match dispenser hardware. Under certain conditions, an ASC may have to perform these commands to repair or convert a dispenser.

Note: Improper dispenser configuration will result in display of applicable configuration error codes when pump is placed in normal operation.

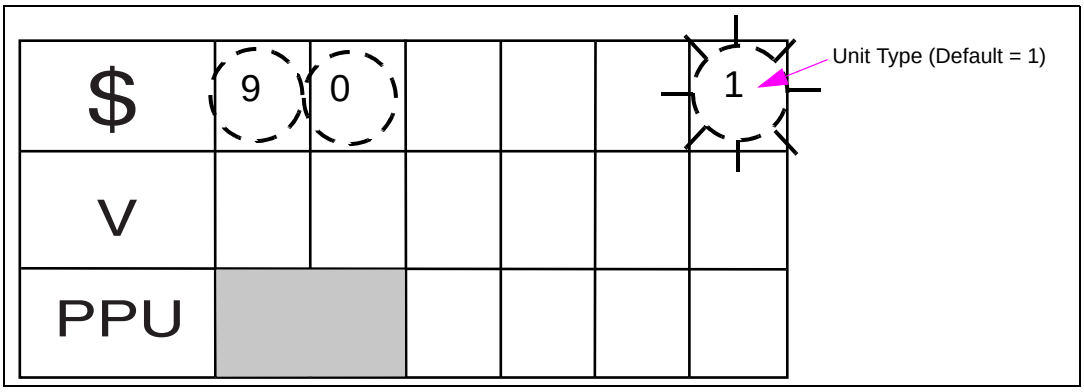
Programming Level	Security PIN Code	Command Code Range
Level 4	0128	90 - 109

- Press **ENTER** after making selection in all Levels.
- Press **F1** to perform additional programming.
- Press **F2** to exit programming.

Command Code 90: Set Unit Type

Function allows programmer to set unit type for dispenser.

Figure 5-96: Setting Unit Type



You must perform a "cold cold start" before changing selection in CC90 or the unit type may not be properly set, regardless of what is indicated during programming.

Unit type assignment is based on a numeric code as shown in the following table:

Unit Type Assignment Table

Option	Unit Type	Option	Unit Type
1 (Default)	1 Grade, 1 Hose MPD	11	3 Grade, 1 Hose 1 Meter MPD
2	2 Grade, 2 Hose MPD	12	2 Grade, 1 Hose Blender
3	3 Grade, 3 Hose MPD	13	3 Grade, 1 Hose Blender
4	4 Grade, 4 Hose MPD	14	4 Grade, 1 Hose Blender
5	2 Grade, 1 Hose MPD	15	5 Grade, 1 Hose Blender
6	3 Grade, 1 Hose MPD	16	2 Grade, 1 Hose Blender + 1
7	3 Grade, 1 Hose + 1 MPD	17	3 Grade, 1 Hose Blender + 1
8	3 Grade, 3 Hose Blender	18	4 Grade, 1 Hose Blender + 1
9	3 Grade, 3 Hose Blender + 1	19	5 Grade, 1 Hose Blender + 1
10	3 Grade, 3 Hose 1 Meter MPD	20	Super High

1 On the Manager Keypad press **9**, then **0**, then **ENTER**.

2 Select Unit Type (**1** to **21**), then press **ENTER**.

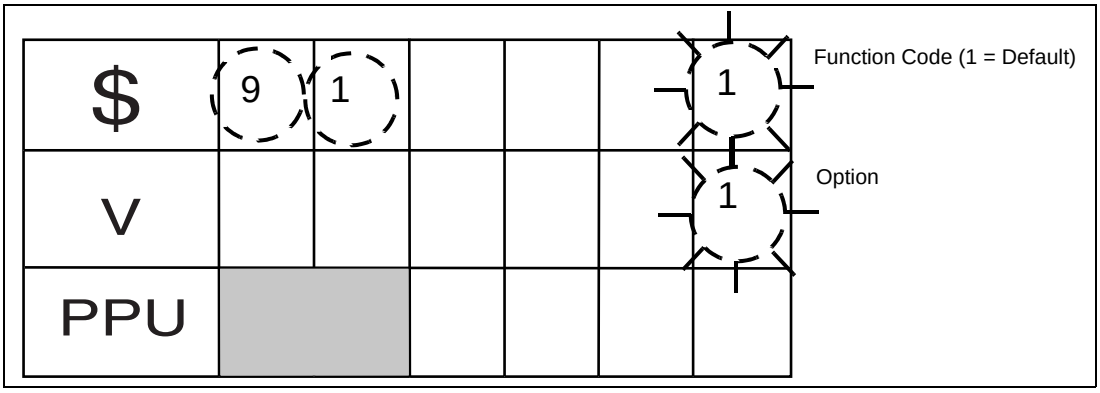
Command Code 91: Select Installed Options

Note: Self-Configuring.

Allows the factory, and under certain circumstances, a field programmer, to install optional equipment in dispenser. Function Codes under this command are used to enable/disable dispenser options. By default, all options are not installed. Entry into Command Code 91 will default to Function Code 1. The dispenser will generate an event log for improperly configured options.

Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-97: Selecting the Installed Options



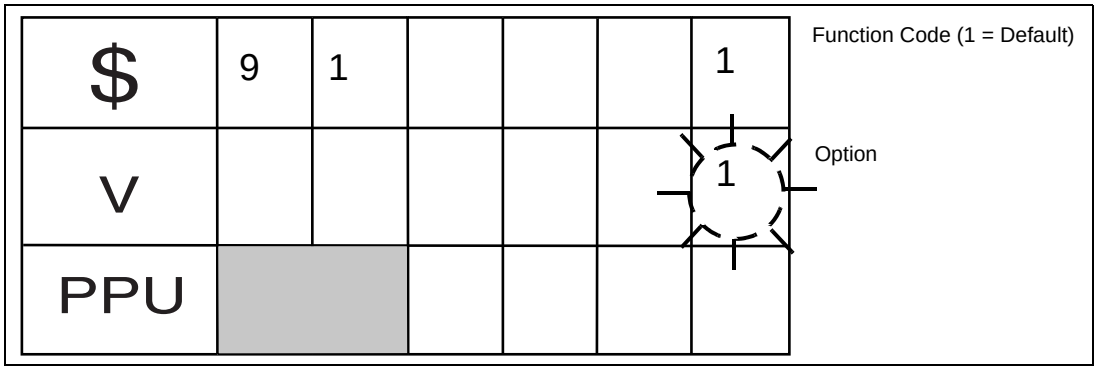
1 On the Manager Keypad press **9**, then **1**, then **ENTER**.

2 Select Function Code (**1** to **21**), then press **ENTER**.

Function Code and Option Selection Table.

Function Code	Dispenser Option Description	Option Selections
1 - Default	Preset Type	1 = No Keypad (Default)
		2 = 5 Button Preset
		3 = Incremental Preset
		4 = Programmable Pump Preset
2	Push to Start	1 = Not Installed
		2 = Installed
3	VaporVac	1 = Not Installed (Default)
		2 = Installed
4	Master/Satellite	1 = Not Installed (Default)
		2 = Installed
5	Push to Stop Button	1 = Not Installed (Default)
		2 = Installed
6	ATC	1 = Not Installed (Default)
		2 = Installed
11	Totalizer Function	1 = Not Installed (Default)
		2 = Installed (one per meter/side)
		3 = Installed (one per inlet/unit)
12	Nozzle Activated Pump Handle	1 = Not Installed (Default)
		2 = Installed
13	Meter Type	1 = C++ Meter (Default)
		2 = LC Meter

Figure 5-98: Selecting the Option Code

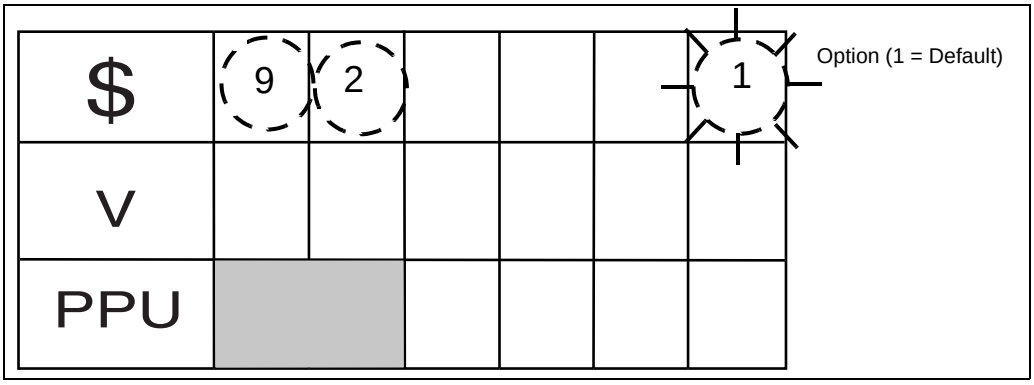


3 Select Option Code, then press **ENTER**.

Command Code 92: Set Side Exists

Option allows setting up for single sided operation. Default is for both sided operation. Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-99: Setting Up for Single Sided Operation



1 On the Manager Keypad press **9**, then **2**, then **ENTER**.

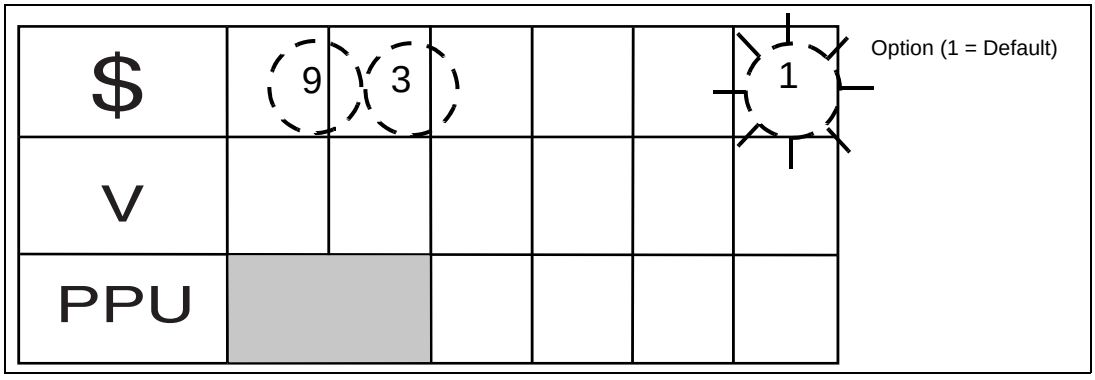
Option	Sides Active
1 (Default)	Both Sides
2	Side 1 Only
3	Side 2 Only

2 Select Function Code (**1** to **3**), then press **ENTER**.

Command Code 93: Set Cash/Credit at Dispenser

Command Code 93 allows programmer to enable cash/credit for each side of dispenser. Layout and meaning of each digit position for this programming feature is shown below.

Figure 5-100: Setting Cash/Credit at Dispenser



1 On the Manager Keypad, press **9**, then **3**, then **ENTER**.

2 Select Side (**1** or **2**), then press **ENTER**.

Option	Sides Active
1 (Default)	No Cash/Credit

Option	Sides Active
2	Side 1 Only
3	Side 2 Only
4	Both Sides

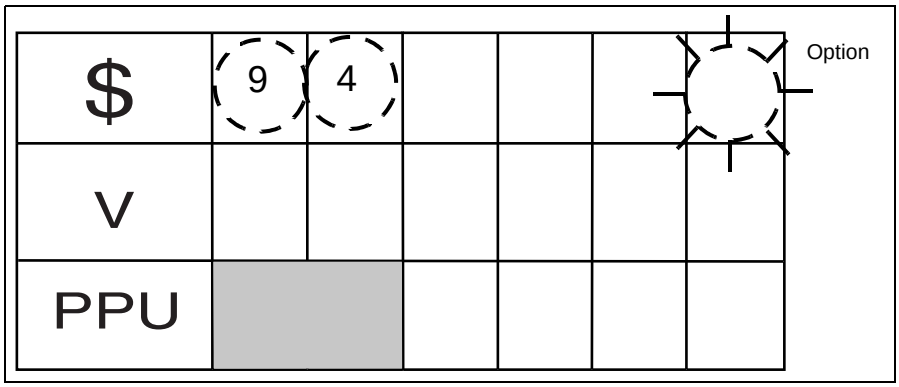
3 Select Option Code (**1** to **4**), then press **ENTER.**

Command Code 94: Set Zero PPU Option

When this option is enabled, the dispenser is allowed to dispense fuel with a zero PPU. Default is "DISABLED", meaning that dispenser will not deliver fuel if any PPU is set to zero.

This Command Code is commonly used when a dispenser is not being used for retail sales. Layout and meaning of each digit position for this programming feature is shown in the following diagram.

Figure 5-101: Setting Zero PPU Option



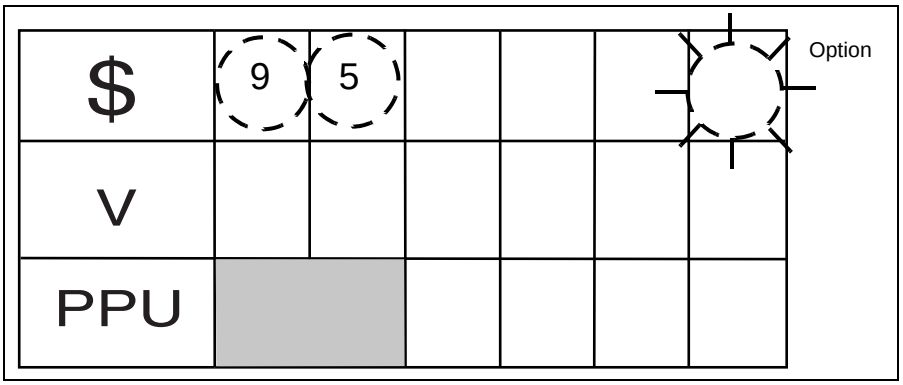
1 On the Manager Keypad, press **9** then **4**, then press **ENTER**.

Selection	Option
1 (Default)	Disabled
2	Enabled

2 Select Option **1** or **2**, then press **ENTER.**

Command Code 95: Reset Start/Force Application Download

Figure 5-102: Resetting Start/Force Application Download



1 On the Manager Keypad, press **9,** then **4**, then press **ENTER**.

Selection	Option
1 (Default)	Disabled
2	Enabled

2 Select Option **1** or **2**, then press **ENTER.**

Additional Manager Functions for Encore 5XX

Unit Totals Retrieval Convention

Totals Examples

For both **$ TOTAL** and **VOL TOTAL** keys, press **ENTER** to toggle between grade and side selection.

Non-Resettable Money and Volume Totals

The dispenser maintains a set of non-resettable totals for each dispensed fuel grade. These totals reflect total money and volume since dispenser installation time. Following are keypad and display examples for viewing dispenser non-resettable money and volume totals.

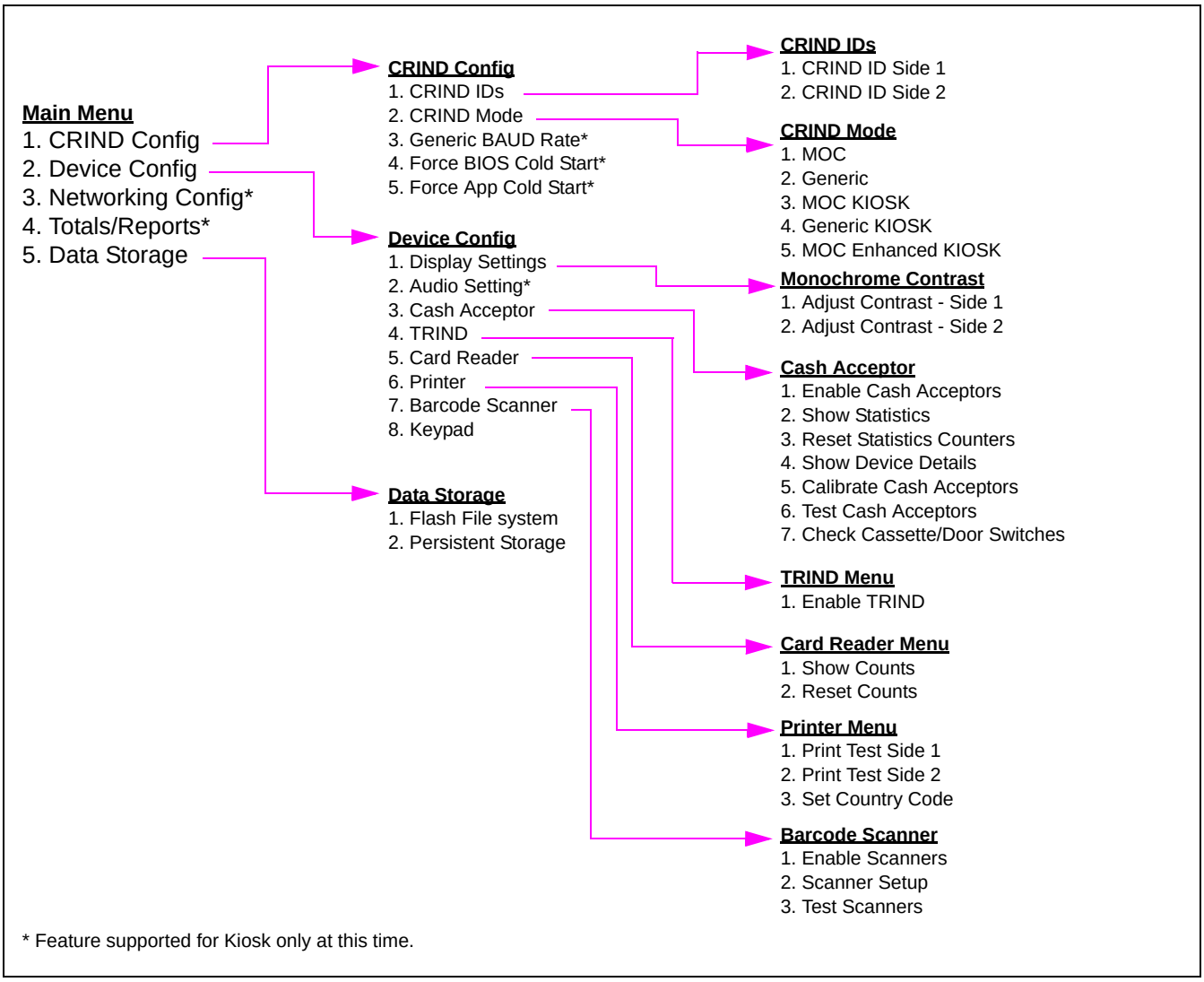
Money and Volume Totals

Use the **$ TOTAL** key to retrieve money totals for each fuel grade. This and the **VOL TOTAL** key do not require a Security PIN Code. Use the **CLEAR** key to exit money totals mode. The “1” shown in the leftmost $ display indicates that this total is a non-resettable money total. The **VOL TOTAL** displays the volume for the grade selected. Volume for both sides of the unit can be viewed. Use the **CLEAR** key to exit the volume total mode. This convention comes from the Advantage series product line and is maintained here for ASC and site manager familiarity.

Programming and Diagnostics of CRIND and TRIND at Pump/Dispenser

Menu Tree

The following diagram shows the options that are available from the Main Menu:



* Feature supported for Kiosk only at this time.

Activating the Encore 5XX CRIND Device

Perform the following steps to activate the CRIND device. Refer to MDE-2562 CRIND Service Manual for details on enabling the CRIND device.

1. Restore power to the fueling units.
2. Initiate CRIND BIOS Diagnostics using Diagnostic Card Q12534-170.
3. In the **Diagnostic Startup Menu** window, select **1. Main Menu.**
4. In **Main Menu** window, select **1. CRIND Config**.
5. In the **CRIND Config** window, select **1. CRIND IDs**.
6. In the **CRIND IDs** window, select **1. CRIND ID Side 1**.
7. In the **CRIND ID Side 1** window, enter a value between 1 to 32 that corresponds to address of the fueling unit. Press **ENTER** to have the value committed to memory and revert the CRIND device to the **CRIND ID's** window.
8. In the **CRIND IDs** window, select **2. CRIND ID Side 2**.
9. In the **CRIND ID Side 2** window, enter a value between 1 to 32 that corresponds to address of the fueling unit. Press **ENTER** to have the value committed to memory and revert the CRIND device to the **CRIND ID's** window.
10. Press **CANCEL** to return to the **CRIND Config** window.
11. In the **CRIND Config** window, select **2. CRIND Mode**.
12. In the **CRIND Mode** window, if setup is for G-SITE®, select **1. MOC**. If setup is not for G-SITE (that is, third party POS), select **2. Generic**. Press the **ENTER** to have the selected value committed to memory and revert the CRIND device to the **CRIND Config** window.

CRIND Configuration

From the Main Menu, press **1**. The CRIND Config menu displays.

CRIND Config

1. CRIND IDs
2. CRIND Mode
3. Generic BAUD Rate
4. Force BIOS Coldstart
5. Force App Coldstart

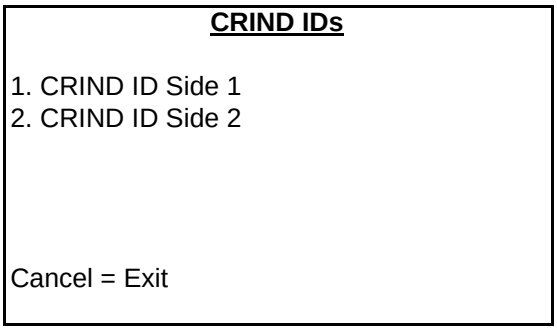
Cancel = Exit

*Note: On most screens, you can navigate to the previous screens by pressing **Cancel**.*

CRIND IDs

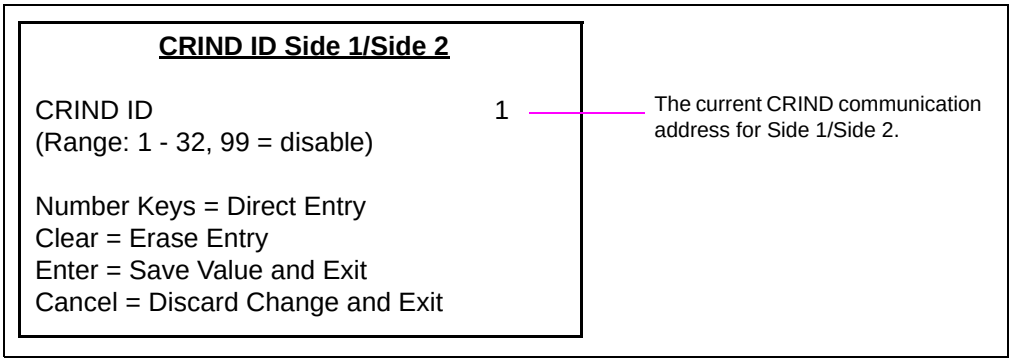
This function allows you to choose the side of the dispenser for which IDs should be programmed.

1 From the CRIND Config menu, press **1.** The following screen appears.



2 Press **1** to enter the CRIND ID Side 1 screen. Press **2** to enter the CRIND ID Side 2 screen.

The following screen appears. The heading of the screen will depend on whether you selected Side 1 or Side 2.


CRIND ID Side 1/Side 2
CRIND ID
(Range: 1 - 32, 99 = disable)
1
Number Keys = Direct Entry
Clear = Erase Entry
Enter = Save Value and Exit
Cancel = Discard Change and Exit
The current CRIND communication address for Side 1/Side 2.

3 Press numeric keys to enter one or two-digit CRIND ID. Legal values for this field are 1-32 and 99. Setting the value at 99 configures the side not to answer polls on the CRIND communication loop. This is useful for field troubleshooting and diagnostic purposes.

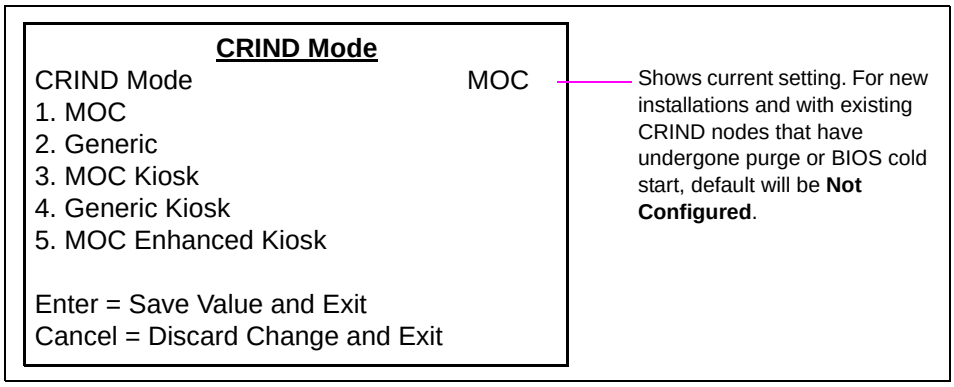
4 Press **Enter** to save the edited CRIND ID and exit. The CRIND ID menu appears.

~ OR ~

Press **Cancel** to discard changes and exit. CRIND IDs menu appears.

CRIND Mode

1 From the CRIND Config menu, press **2**. The CRIND Mode menu appears.


CRIND Mode
CRIND Mode MOC
1. MOC
2. Generic
3. MOC Kiosk
4. Generic Kiosk
5. MOC Enhanced Kiosk
Enter = Save Value and Exit
Cancel = Discard Change and Exit
Shows current setting. For new installations and with existing CRIND nodes that have undergone purge or BIOS cold start, default will be **Not Configured**.

2 Press numeric key to change the current CRIND mode setting:
- **1** causes the unit to operate in MOC CRIND The Advantage Series - compatibility mode.
- **2** causes the unit to operate in Generic CRIND The Advantage Series - compatibility mode.
- **3** causes the unit to operate in MOC Kiosk mode and will automatically set the other Side's CRIND ID to 99.
- **4** causes the unit to operate in Generic Kiosk mode and will automatically set the other Side's CRIND ID to 99.

3 Press **Enter** to save changes and exit. The CRIND Config menu appears.

~ OR ~

Press **Cancel** to discard changes and exit. The CRIND Config menu appears.

Generic BAUD Rate

This option is currently disabled. Pressing **3** from the CRIND Config menu causes the Unsupported Feature screen to display.

Force BIOS Cold Start

This option is currently disabled. Pressing **4** from the CRIND Config menu causes the Unsupported Feature screen to display.

Force App Cold Start

This option is currently disabled. Pressing **5** from the CRIND Config menu causes the Unsupported Feature screen to display.

Device Configuration

From the Main Menu, press **2**. The Device Config menu appears.

Device Config
1. Display Settings
2. Audio Setting
3. Cash Acceptor
4. TRIND
5. Card Reader
6. Printer
7. Barcode Scanner
8. Keypad

Display Settings

This function allows you to select a display side for contrast adjustment. If the contrast setting for one side has been set to a value that renders the display temporarily unusable, you can adjust contrast from the opposite side of the unit.

1 From the Device Config menu, press **1**. The following screen appears:

Monochrome Contrast

1. Adjust Contrast - Side 1
2. Adjust Contrast - Side 2

Cancel = Exit

2 To display the settings for Side 1, press **1**. To display the settings for Side 2, press **2**. A screen displays the contrast settings for the side that was selected:

Contrast - Side1/Side 2

Contrast 35
(Range: 1-99)

Number Keys = Direct Entry
Clear = Erase Entry Up>
Enter = Apply Entry
Cancel = Exit Down>

3 Use numeric keys to enter a one or two-digit contrast setting. Press the **Up** or **Down** function keys (if applicable) to increase or decrease the contrast setting.

4 Press **Enter** to apply the change made to the contrast setting and view the display with the new setting immediately.

5 Press **Cancel** to exit the screen and return to the Monochrome Contrast menu. If the contrast setting is currently blank, the display will continue to show the last valid contrast setting that was entered.

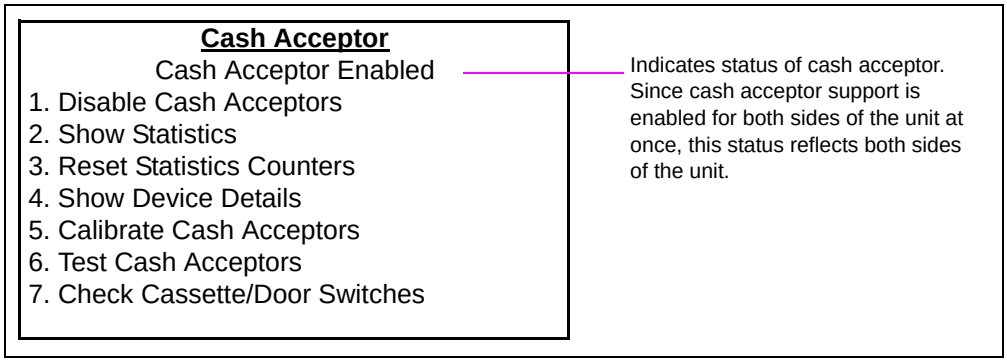
Audio Setting

This option is currently available for kiosk only. Press **2** from the Device Config menu to access this feature.

Cash Acceptor

The Cash Acceptor menu allows the user to configure and test operation of the cash acceptors.

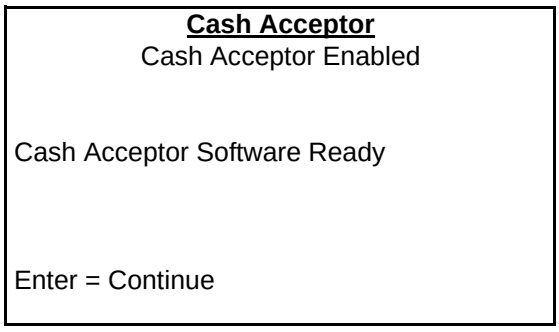
From the Device Config menu, press **3**. The following screen appears:


Cash Acceptor
Cash Acceptor Enabled
1. Disable Cash Acceptors
2. Show Statistics
3. Reset Statistics Counters
4. Show Device Details
5. Calibrate Cash Acceptors
6. Test Cash Acceptors
7. Check Cassette/Door Switches
Indicates status of cash acceptor. Since cash acceptor support is enabled for both sides of the unit at once, this status reflects both sides of the unit.

Enable/Disable Cash Acceptors

From the Cash Acceptor main menu, press **1** to toggle between enabling and disabling the cash acceptors. Once the cash acceptors are enabled, the cash acceptor software is started when a function, such as the Show Statistics option is chosen, that requires the software to be running.

The following screen will display the first time you attempt to access a cash acceptor function in diagnostics mode:

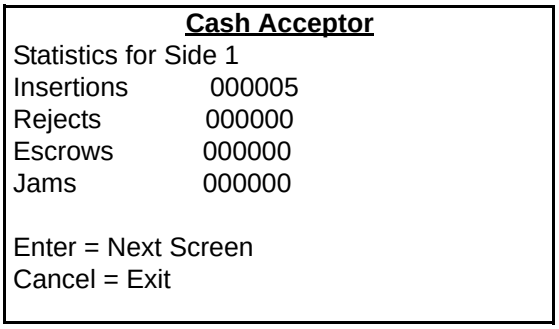


Press **Enter** to continue to the screen option you selected.

Show Statistics

This function allows you to view the cash acceptor events statistics for each side of the unit for troubleshooting purposes. Cash acceptor statistics are collected for all cash acceptor activity, regardless of whether the cash acceptor events occur in the course of normal transactions or during a diagnostics session.

1 From the Cash Acceptor main menu, press **2**. The following screen appears.



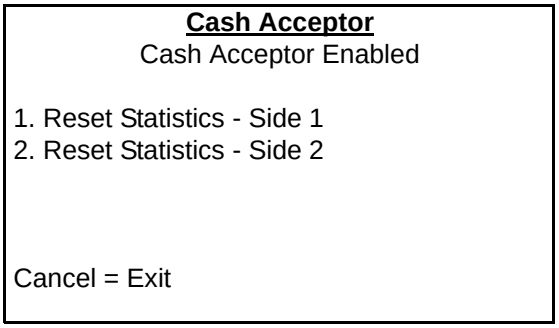
2 Press **Enter** to toggle between Side 1 and Side 2 counter screens. The first screen displays the statistics for Side 1, and the second screen displays the statistics for Side 2.

3 Press **Cancel** to exit back to the Cash Acceptor main menu.

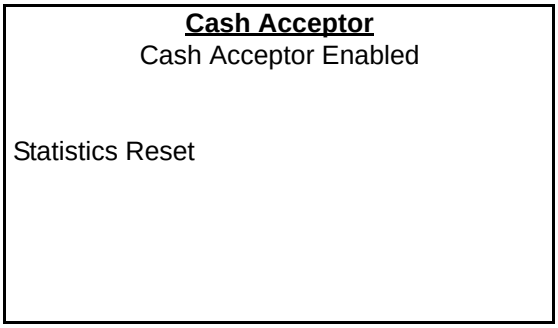
Reset Statistics Counters

This function allows you to reset cash acceptor event statistics for each side of the unit. This function should be used after correcting a cash acceptor problem so that future statistics will reflect the repaired cash acceptor state. Statistics will also be cleared each time persistent storage is cleared/purged via the Persistent Storage Menu.

1 From the Cash Acceptor main menu, press **3**. The following screen appears:



2 To reset statistics for Side 1, press **1**. To reset statistics for Side 2, press **2**. The following screen appears to confirm that the statistics have been reset:



3 The Cash Acceptor Reset Statistics screen displays after a few seconds. Press **Cancel** to exit back to the Cash Acceptor main menu.

Show Device Details

This screen allows you to query the firmware version(s) installed on each of the cash acceptor units in the system.

1 From the Cash Acceptor main menu, press **4**. The following screen appears:

Cash Acceptor
Cash Acceptor Enabled
Side 1 Details
Model: 80 Firmware Version: 36

Side 2 Details
Model: 80 Firmware Version: 36

Cancel = Exit

2 Press **Cancel** to exit back to the Cash Acceptor main menu.

Calibrate Cash Acceptors

This function allows you to execute a calibration procedure on either side of the unit.

Note: It is possible to calibrate the cash acceptor from the single side that started the diagnostics session.

1 From the Cash Acceptor main menu, press **5**. The following screen appears.

Cash Acceptor
Cash Acceptor Enabled

1. Calibrate - Side 1
2. Calibrate - Side 2

Cancel = Exit

2 To calibrate Side 1, press **1**. To calibrate Side 2, press **2**. The following warning screen appears for the Side being calibrated:

Note: Do not calibrate using currency.

Cash Acceptor
Cash Acceptor Enabled
WARNING: You must insert a proper calibration slip on the next screen to calibrate the cash acceptor.
If you do NOT have a calibration slip, exit NOW using the Cancel key.
Enter = Continue
Cancel = Exit

If you select any interactive cash acceptor operation for the opposite side—the side that is not being calibrated—the following warning screen appears.

Cash Acceptor
Cash Acceptor Enabled

WARNING: You will disrupt cash acceptor sales on the other side of this dispenser until it is restarted

Enter = Continue
Cancel = Exit

3 Press **Enter** to continue with the calibration and advance to the next screen.

~ OR ~

Press **Cancel** to stop the calibration process and exit back to the Cash Acceptor main menu.

4 If **Enter** was pressed, the following screen appears.

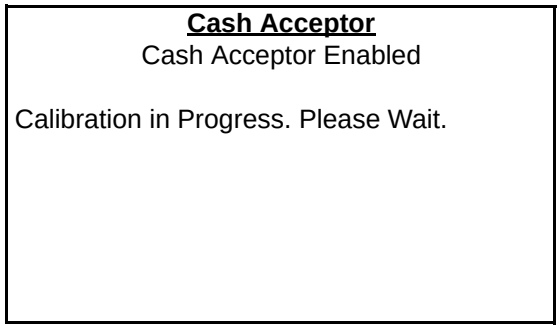
Cash Acceptor
Cash Acceptor Enabled

Insert Calibration slip

The two green “arrow” lights on the cash acceptor bezel will blink rapidly, indicating that the device is in calibration mode and ready to accept a calibration card.

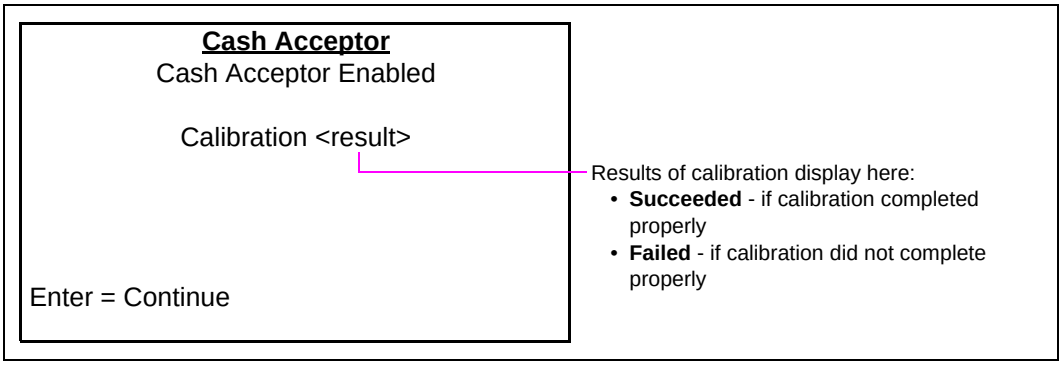
A reference slip of calibration paper, approximately the size of United States paper currency, is required to perform this operation.

5 Insert the calibration slip. The following screen appears.



The cash acceptor calibrates itself to the content it received from the calibration slip.

The following screen displays once the cash acceptor has completed calibration. The operator's result is displayed.


Cash Acceptor
Cash Acceptor Enabled
Calibration <result>
Enter = Continue
Results of calibration display here:
• Succeeded - if calibration completed properly
• Failed - if calibration did not complete properly

6 Press **Enter** to return to the Cash Acceptor calibration menu.

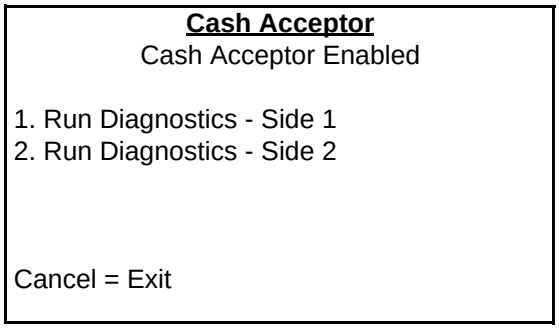
Test Cash Acceptors

This function allows you to execute specific diagnostic tests on the cash acceptor. The following functions can be performed:

- Inserting a bill and reading/escrowing the bill if not rejected by the cash acceptor.
- Returning a bill from the escrow position.
- Returning a bill from the escrow position and exiting Diagnostics Mode.
- Stacking a bill from the escrow position (if a Test Cassette has been installed).

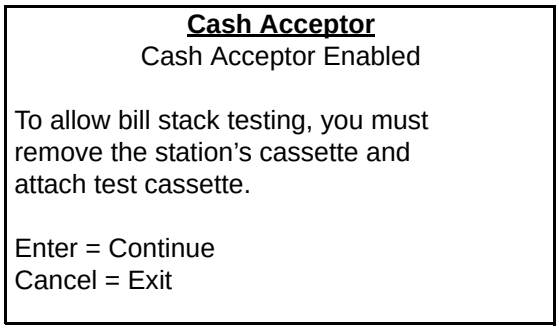
Note: A second Test Cassette is necessary to stack bills during diagnostics mode. The CRIND BIOS must see a set of cassette-removed/replaced events to allow bill stack testing. Otherwise, the "stack bill" option will not be provided from the Cash Acceptor Interactive Diagnostics Menu.

1 From the Cash Acceptor main menu, press **6**. The following screen appears:



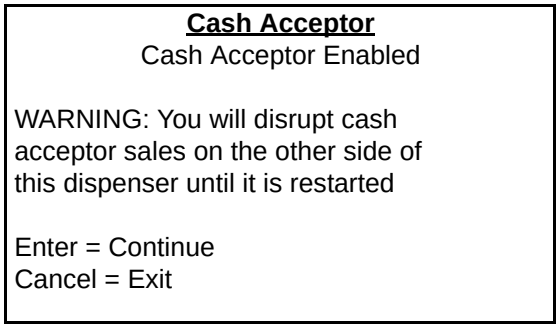
2 To start diagnostic tests for Side 1, press **1**. To start diagnostic tests for Side 2, press **2**.

A message "Please Wait..." is displayed, and then the following screen appears:


Cash Acceptor
Cash Acceptor Enabled
To allow bill stack testing, you must remove the station's cassette and attach test cassette.
Enter = Continue
Cancel = Exit

Notes:1) If the CRIND BIOS detects a pair of Cassette Removed/Cassette Replaced events as having occurred some time earlier in the current diagnostics session, this screen will not appear.

2) If you select any interactive cash acceptor operation for the opposite side—the side that is not being calibrated, the following warning screen appears:


Cash Acceptor
Cash Acceptor Enabled
WARNING: You will disrupt cash acceptor sales on the other side of this dispenser until it is restarted
Enter = Continue
Cancel = Exit

3 If you are troubleshooting a potentially defective casette, remove the station cassette and replace it with another similar cassette for testing purposes.

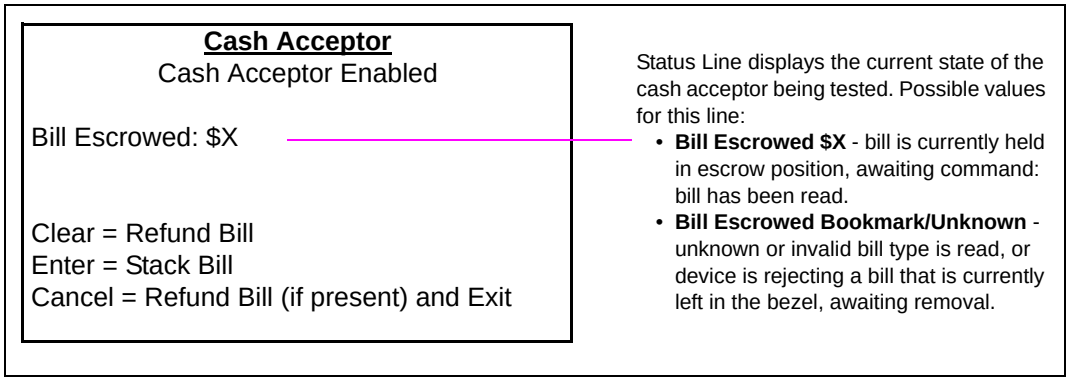
4 Press **Enter** to display the Cash Acceptor Insert Bill screen.

Cash Acceptor
Cash Acceptor Enabled

Insert Bill

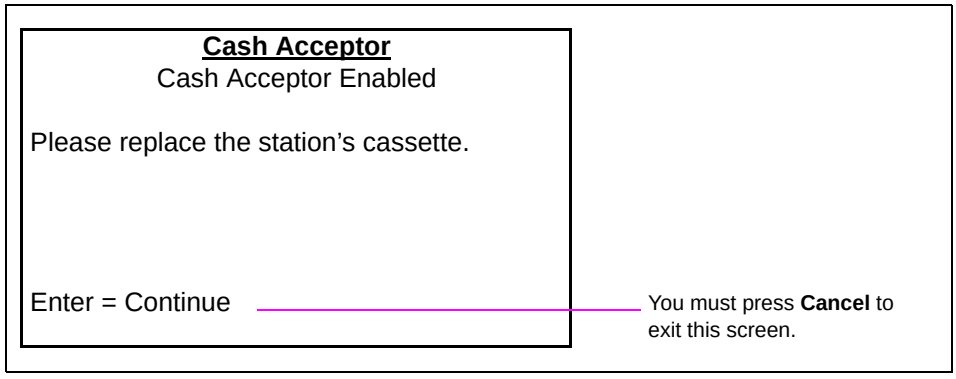
Cancel = Exit

5 Insert a bill into the cash acceptor (on the side selected in the Cash Acceptor Diagnostics menu) to initiate diagnostics tests. The following screen appears.


Cash Acceptor
Cash Acceptor Enabled
Bill Escrowed: $X
Clear = Refund Bill
Enter = Stack Bill
Cancel = Refund Bill (if present) and Exit
Status Line displays the current state of the cash acceptor being tested. Possible values for this line:
• Bill Escrowed $X - bill is currently held in escrow position, awaiting command: bill has been read.
• Bill Escrowed Bookmark/Unknown - unknown or invalid bill type is read, or device is rejecting a bill that is currently left in the bezel, awaiting removal.

6 Press one of the following keys:
- **Clear** - instructs cash acceptor to return the bill in escrow
- **Enter** - instructs cash acceptor to stack the escrowed bill in the test cassette. *Note:This option is only available if the CRIND BIOS previously detected a cassette swap.*
- **Cancel** - instructs cash acceptor to return the bill in escrow. You are asked to replace the station's cassette and then must press **Enter**. The Cash Acceptor Run Diagnostics screen appears.

7 When ready to exit screen, press **Cancel**. The following screen appears.


Cash Acceptor
Cash Acceptor Enabled
Please replace the station's cassette.
Enter = Continue
You must press Cancel to exit this screen.

8 Remove the test cassette and return the station's cassette. This operation should be performed by the manager so that the vault can be locked when the station cassette is restored.

9 Press **Cancel** to return to the Cash Acceptor Diagnostics Menu.

Check Cassette/Door Switches

This function allows you to select which side of the unit should be used for switch testing. It is possible to check switches on either side, regardless of which side started the diagnostics session. Use this function to test the operation of the three switches that govern cash acceptor operation:

- **Cassette switch** - changes state whenever cash acceptor cassette is removed or replaced.
- **Vault switch** - changes state whenever the cash acceptor vault is opened or closed.
- **Door switch** - changes state whenever the main Encore CIM door or Eclipse oven door is opened or closed.

1 From the Cash Acceptor main menu, press **7**. The following screen appears:

Cash Acceptor
Cash Acceptor Enabled

1. Check Switches - Side 1
2. Check Switches - Side 2

Cancel = Exit

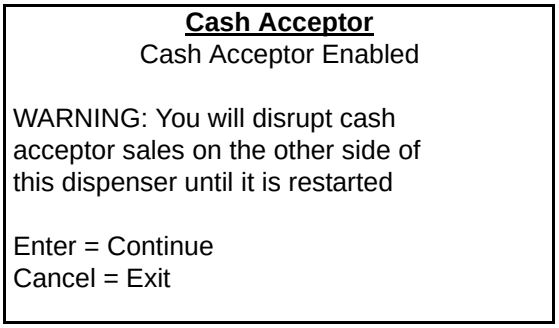
2 To start the switch testing procedure for Side 1, press **1**. To start the switch testing procedure for Side 2, press **2**. The following screen appears:

Cash Acceptor
Cash Acceptor Enabled

Cassette Switch: Closed
Vault Switch: Open
Door Switch: Open

Cancel = Exit

If you select any interactive cash acceptor operation for the opposite side—the side that is not being tested, the following warning screen appears.


Cash Acceptor
Cash Acceptor Enabled
WARNING: You will disrupt cash acceptor sales on the other side of this dispenser until it is restarted
Enter = Continue
Cancel = Exit

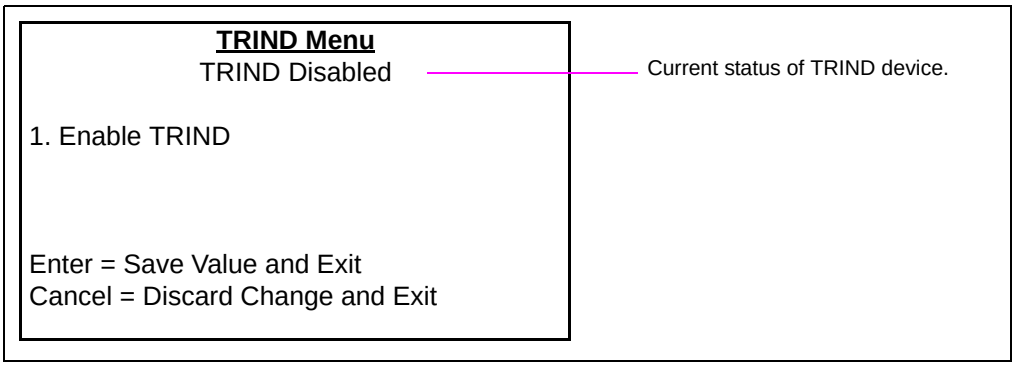
- To continue with the previously selected cash acceptor task, press **Enter**
- To revert back to the Cash Acceptor main menu, press **Cancel**

3 Press **Cancel** to exit back to the Cash Acceptor Test Switches Menu.

TRIND Device

The TRIND Menu option allows the CRIND BIOS support for TRIND device hardware to be enabled or disabled.

1 From the Device Config menu, press **4**. The following screen appears.


TRIND Menu
TRIND Disabled
Current status of TRIND device.
1. Enable TRIND
Enter = Save Value and Exit
Cancel = Discard Change and Exit

2 Press **1** to toggle between disabling and enabling the TRIND device.

3 Press **Enter** to save the current setting and return to the Device Config menu.

~ OR ~

Press **Cancel** to discard the current setting and return to the Device Config menu.

Card Reader

This menu allows a technician to review and manage the card reader statistics (counts) that have been collected since the last time the card reader statistics have been cleared. Card reader counts are collected both during the course of normal transactions as well as during a diagnostics session. Card read percentages can be derived from these numbers to analyze whether this card reader is working acceptably or requires cleaning or repair. Compare results to other units and similar stations.

Note: A 100% reading will never occur as not all cards will be inserted properly or it may be a wrong or defective card.

From the Device Config menu, press **5**. The following screen appears.

Card Reader Menu

1. Show Card Counts
2. Reset Card Counts

Cancel = Exit

Show Card Counts

When this screen is displayed, you will not be able to exit diagnostics mode by using the Gilbarco CRIND diagnostics card. This feature allows you to use the diagnostics card on this screen to interactively test the card reader without inadvertently exiting the configuration interface session.

1 From the Card Reader Menu, press **1**. The Card Reader Counts screen displays for Side 1.

Card Reader Side 1

	Track 1	Track 2	Track 3
Good Reads	13	13	0
Bad Reads	0	0	0
Total Reads			0
Total Reads Without Data			0

Enter = Next Screen
Cancel = Exit

Note: ISO magstripe cards support up to three "tracks" (sets) of data storage. The data follows a certain format and contains a checksum to guarantee against data corruption on the track.

The screen reports the current totals for each of the supported card reader statistics:

- **Track 1 Good Reads** - count of card insertions with good track 1 data
- **Track 1 Bad Reads** - count of card insertions with bad track 1 data
- **Track 2 Good Reads** - count of card insertions with good track 2 data
- **Track 2 Bad Reads** - count of card insertions with bad track 2 data
- **Track 3 Good Reads** - count of card insertions with good track 3 data
- **Track 3 Bad Reads** - count of card insertions with bad track 3 data
- **Total Reads** - count of all card insertions with at least some valid data on at least one track
- **Total Reads Without Data** - count of card insertions with no valid data present.

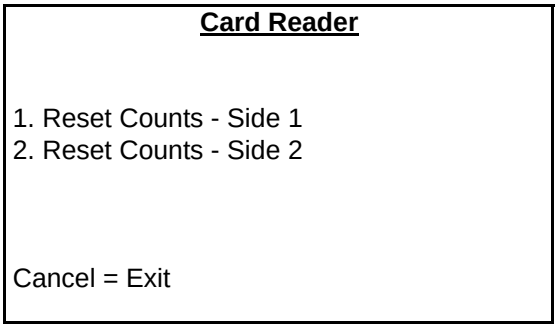
2 Press **Enter** to toggle between Side 1 and Side 2 card reader counts screens.

3 Press **Cancel** to exit back to the Card Reader Menu.

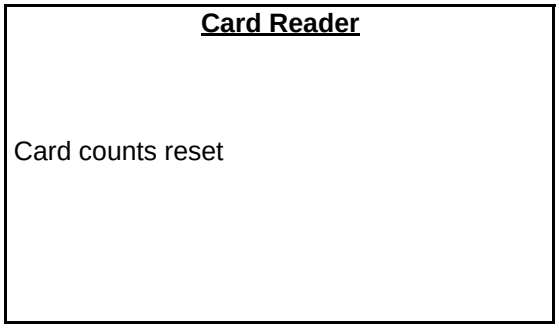
Reset Card Counts

This function allows the technician to reset card reader counts independently for each side of the unit.

1 From the Card Reader Menu, press **2**. The following screen appears.



2 To reset the card reader counts for Side 1, press **1**. To reset the card reader counts for Side 2, press **2**. The following screen appears.



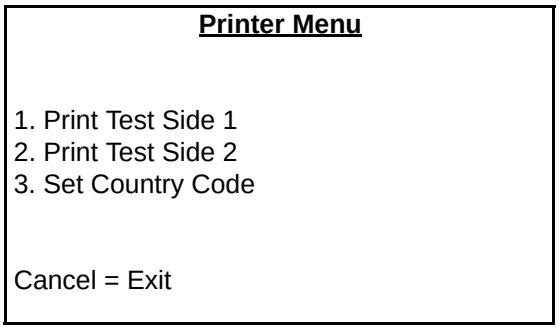
This screen appears for several seconds; then the Card Reader reset menu displays.

3 Press **Cancel** to return to the Card Reader Menu.

Printer

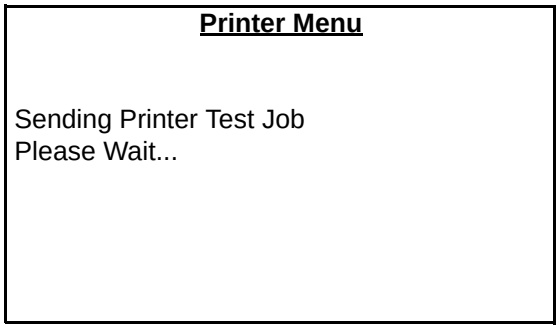
The Printer Menu allows you to perform certain configuration and diagnostics tasks on the printers.

From the Device Config menu, press **6**. The following screen appears.



Print Test Sides

From the main Printer Menu, press **1** or **2** to cause a test receipt to print for that particular side and display the following screen:



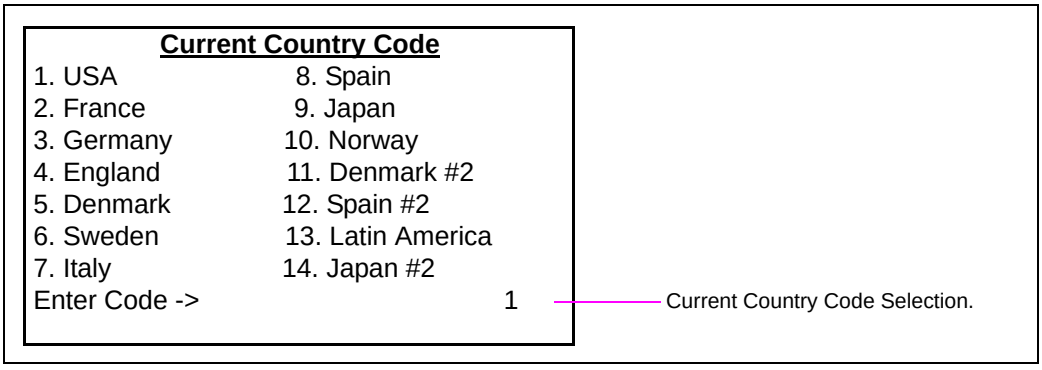
After 5 seconds, the diagnostics session will return to the main Printer Menu, and a sample receipt will be printed on the Side 1 or Side 2 printer.

Note: Starting with CRIND Node software V02.1.60, the test receipt will include a sample UPC-A barcode, printed horizontally, at the bottom of the test receipt. If barcode scanner hardware is present, this barcode should be scannable from the CRIND diagnostics session. Refer to the Barcode Scanner Test Menu for a description of how the barcode should be scanned.

Set Country Code

This function changes the printer's character set to better conform with those used in the individual countries listed at this screen.

1 From the main Printer Menu, press **3**. The following screen appears.



2 Press numeric keys to enter a one or two-digit country code. The default setting is 1 (USA). Values range from 01-14.

3 Press **Enter** to commit the code entered into persistent storage on the CRIND node. If you enter a number incorrectly and wish to delete it, press **Clear**.
Note: If the setting you enter is out of range,"Value Out of Range" will be displayed in this field for a few seconds, and then the field will return to previous setting.

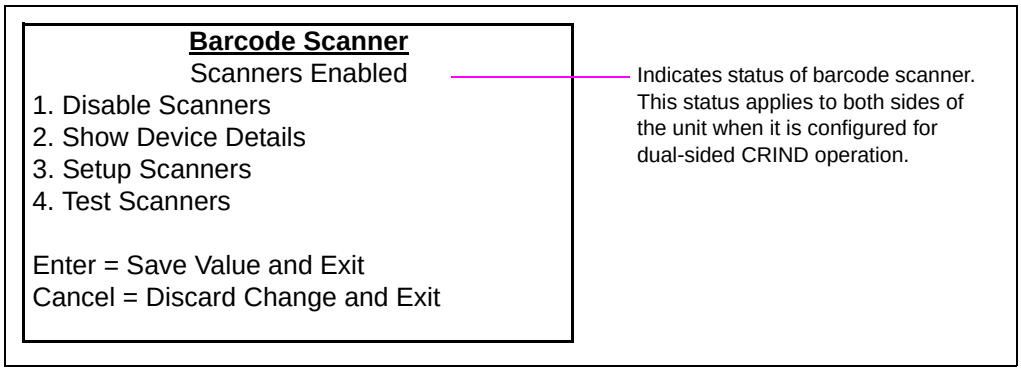
~ OR ~

Press **Cancel** to exit back to the main Printer Menu.

Barcode Scanner

The barcode scanner menu allows you to configure and test barcode scanner operations.

1 From the Device Config menu, press **7**. The following screen appears.


Barcode Scanner
Scanners Enabled
1. Disable Scanners
2. Show Device Details
3. Setup Scanners
4. Test Scanners
Enter = Save Value and Exit
Cancel = Discard Change and Exit
Indicates status of barcode scanner. This status applies to both sides of the unit when it is configured for dual-sided CRIND operation.

2 Use numeric keys to select option from the menu.

3 Press **Enter** to save the changes and exit back to the Device Config menu.

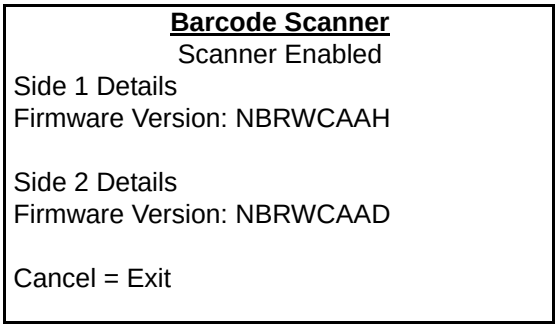
4 Press **Cancel** to disregard any changes and exit to the Device Config menu.

Enable/Disable Scanners

From the Barcode Scanner menu, press **1** to toggle between disabling and enabling the scanner.

Show Device Details

1 From the Barcode Scanner menu, press **2** to display firmware information about Side 1 and Side 2 scanners.



2 Press **Cancel** to return to the Barcode Scanner menu.

Setup Scanner

Use this function to adjust the barcode scanner settings.

From the Barcode Scanner menu, press **3**. If this is the first time entering the barcode setup screen, the following warning screen appears.

Barcode Scanner
Scanner Enabled
WARNING: The following actions could disrupt scanner use by customers on the other side of this dispenser.
Ensure that the other side is not in use before continuing.
Enter = Continue
Cancel = Exit

- To continue to the barcode scanner setup menu, press **Enter.**
- To exit to the Barcode Scanner menu, press **Cancel.**

If this is not the first time entering the barcode setup screen, the barcode setup menu appears.

Barcode Scanner
Scanner Enabled

1. Reset to Factory Defaults
2. View/Change POS Scanner Settings
3. Send POS Settings to Scanner

Cancel = Exit

Reset to Factory Defaults

This function resets the scanner to its default settings. Any required POS-specific settings must be re-applied. Resetting scanners affects both sides automatically.

1 From the Barcode Scanner setup menu, press **1**. The following warning screen displays to remind the technician that all scanner settings will be reset if he/she proceeds:

Barcode Scanner
Scanner Enabled
WARNING: This action will reset scanner setup to factory defaults.
All POS specific changes must be reapplied.

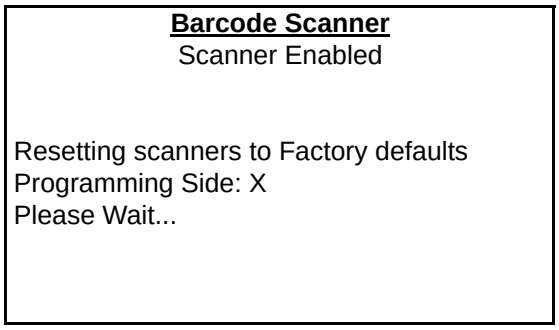
Enter = Continue
Cancel = Exit

2 Press **Enter** to advance the session to begin the process of resetting the scanners to their default settings. All scanner settings will be reset.

~ OR ~

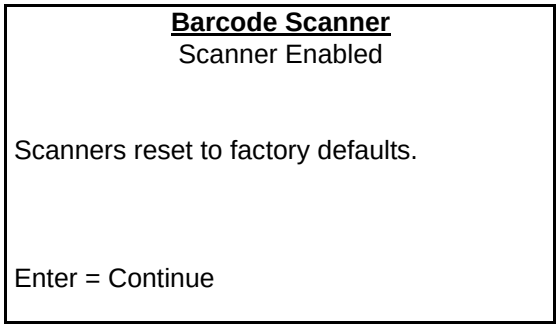
Press **Cancel** to exit back to the Barcode Scanner setup menu without resetting the scanners to their default settings.

If **Enter** is pressed, the following screen displays for Side 1 and then for Side 2:



The scanners are currently being sent configuration commands that will reset them to their default operating parameters.

3 When the reset operations are complete, the following screen appears:

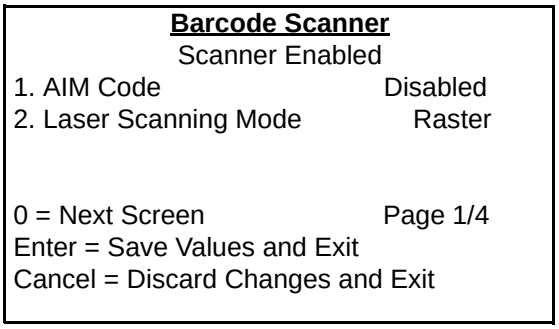


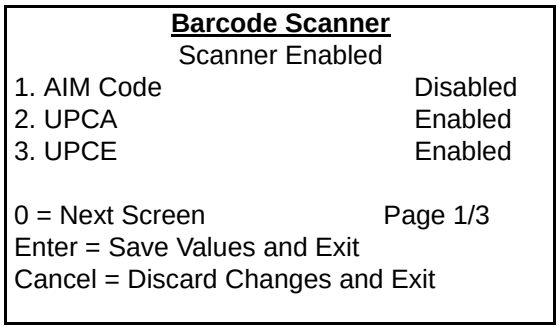
4 Press **Enter** to return to the Barcode Scanner setup menu.

View/Change POS Scanner Settings

This function allows you to enable or disable codes and each of the supported barcode formats. Configuration changes will not be automatically sent to the scanner, the application software (POS) establishes the formats that are supported. Once configuration is complete, all settings must be sent to the scanner at the same time using the "Send POS Settings to Scanner" function.

1 From the Barcode Scanner setup menu, press **2**. The following screen appears:


Barcode Scanner
Scanner Enabled
1. AIM Code Disabled
2. Laser Scanning Mode Raster
0 = Next Screen Page 1/4
Enter = Save Values and Exit
Cancel = Discard Changes and Exit


Barcode Scanner
Scanner Enabled
1. AIM Code Disabled
2. UPCA Enabled
3. UPCE Enabled
0 = Next Screen Page 1/3
Enter = Save Values and Exit
Cancel = Discard Changes and Exit

2 To configure the settings, proceed as follows:

- Press **1** to enable/disable the ability for an AIM Code to be pre-pended to the data reported by the device each time a barcode is scanned.
- Press **2** to enable/disable the ability for an UPCA barcode format to be detected and reported by the scanner toggling between Raster and Cyclonic laser scanning modes.
- Press **3** to enable/disable the ability for an UPCE barcode format to be detected and reported by the scanner.

3 Press **0** to proceed to the next screen. The following screen appears.

Barcode Scanner
Scanner Enabled

1. UPCA	Enabled
2. UPCE	Enabled
3. EAN8	Enabled
0 = Next Screen	Page 2/4

Enter = Save Values and Exit
Cancel = Discard Changes and Exit

Barcode Scanner
Scanner Enabled

1. EAN8	Enabled
2. EAN13	Enabled
3. Code 39	Enabled
0 = Next Screen	Page 2/3

Enter = Save Values and Exit
Cancel = Discard Changes and Exit

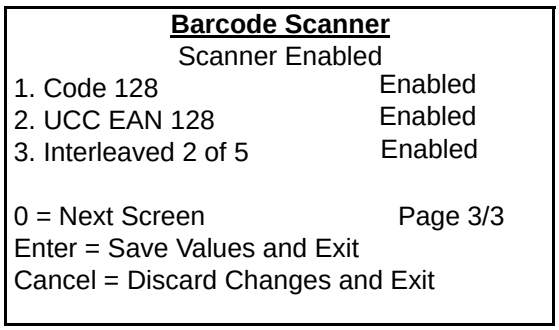
4 To configure the settings, proceed as follows:
- Press **1** to enable/disable the ability for an EAN8 UPCA barcode format to be detected and reported by the scanner.
- Press **2** to enable/disable the ability for an EAN13 UPCE barcode format to be detected and reported by the scanner.
- Press **3** to enable/disable the ability for a Code 39 EAN8 barcode format to be detected and reported by the scanner.

5 Press **0** to proceed to the next screen. The following screen appears.

Barcode Scanner
Scanner Enabled

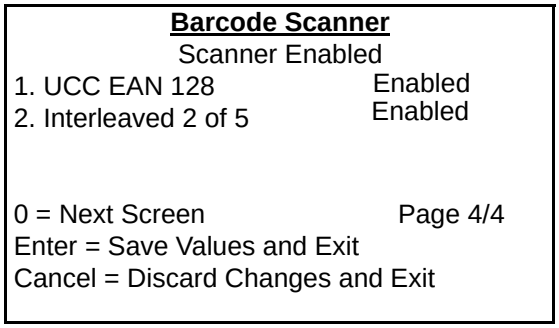
1. EAN 13	Enabled
2. Code 39	Enabled
3. Code 128	Enabled
0 = Next Screen	Page 3/4

Enter = Save Values and Exit
Cancel = Discard Changes and Exit


Barcode Scanner
Scanner Enabled
1. Code 128 Enabled
2. UCC EAN 128 Enabled
3. Interleaved 2 of 5 Enabled
0 = Next Screen Page 3/3
Enter = Save Values and Exit
Cancel = Discard Changes and Exit

6 To configure the settings, proceed as follows:
- Press **1** to enable/disable the ability for a Code 128 EAN 13 barcode format to be detected and reported by the scanner.
- Press **2** to enable/disable the ability for a UCC EAN 128 Code 39 barcode format to be detected and reported by the scanner.
- Press **3** to enable/disable the ability for a Interleaved 2 of 5 Code 128 barcode format to be detected and reported by the scanner.

7 Press **0** to proceed to the next screen. The following screen appears.


Barcode Scanner
Scanner Enabled
1. UCC EAN 128 Enabled
2. Interleaved 2 of 5 Enabled
0 = Next Screen Page 4/4
Enter = Save Values and Exit
Cancel = Discard Changes and Exit

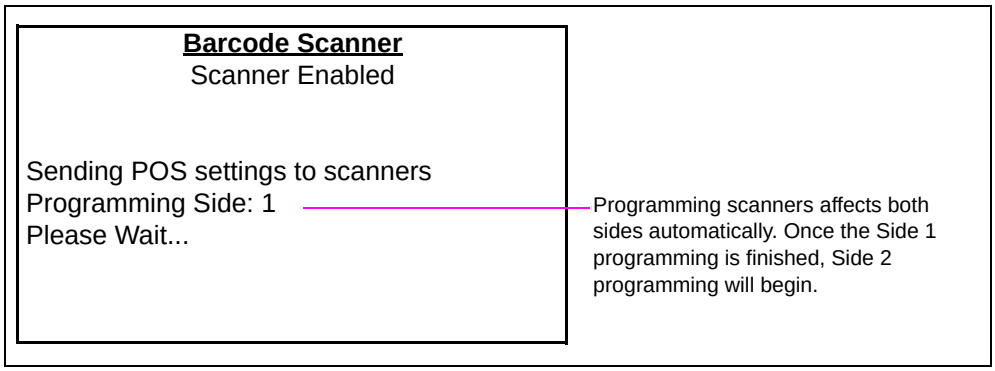
8 Use the following instructions to configure the settings:
- Press **1** to enable/disable the ability for an UCC EAN 128 barcode format to be detected and reported by the scanner
- Press **2** to enable/disable the ability for Interleaved 2 of 5 barcode formats to be detected and reported by the scanner

9 To save changes and exit, press **Enter**. To exit without saving changes, press **Cancel**.

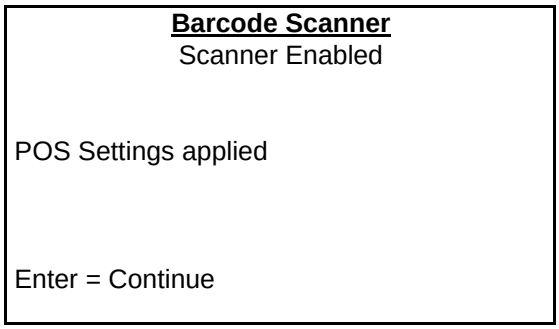
Send POS Settings to Scanner

Use this function to send the changes you made to the scanner settings to the scanner device.

1 From the Barcode Scanner setup menu, press **3**. The following screen appears:


Barcode Scanner
Scanner Enabled
Sending POS settings to scanners
Programming Side: 1
Please Wait...
Programming scanners affects both sides automatically. Once the Side 1 programming is finished, Side 2 programming will begin.

When programming is complete, the following screen appears to notify the technician that all settings from the four-page Barcode Scanner settings menu have been applied.

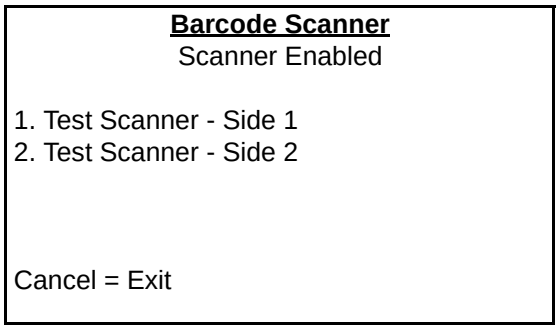


2 Press **Enter** to return to the Barcode Scanner setup menu.

Test Scanners

This function enables the technician to run interactive scanner tests on either side of the unit.

1 From the Barcode Scanner setup menu, press **4**. The following screen appears.



2 Press **1** or **2** to display the Barcode Scanner interactive test screen. This screen enables the barcode scanner for the selected side and allows the technician to present barcodes to be read.

Barcode Scanner
Scanner Enabled

Present test barcode in front of scanner

This test will time-out in 60 seconds

Cancel = Abort

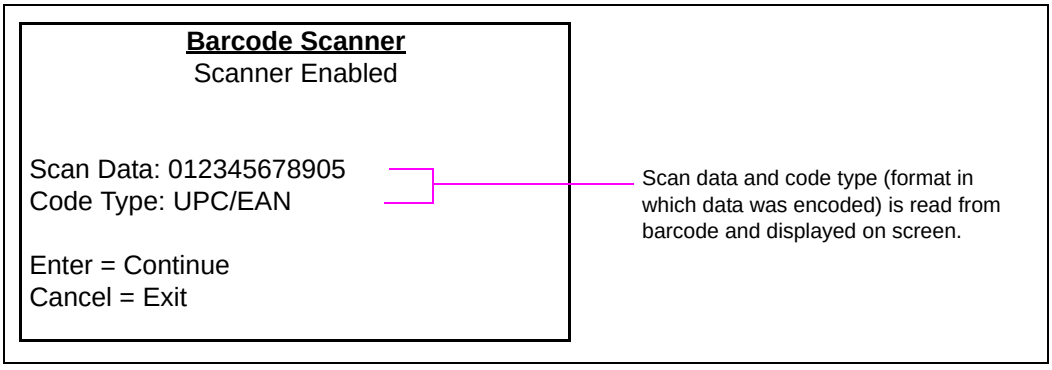
If the diagnostics session is currently running on the opposite side, and this is the first time scanners have been tested in this session, the following warning screen will appear. This is a one-time warning message displayed to alert the technician that interactive barcode testing will disrupt transactions on the opposite side.

Barcode Scanner
Scanner Enabled
WARNING: You will prevent barcode scanner use during sales on the other side of dispenser until it is restarted.

Enter = Continue
Cancel = Exit

- Press **Enter** to advance to the next screen
- Press **Cancel** to exit back to the Barcode Scanner test menu

3 Present a readable barcode in a format currently enabled on the scanner. The following screen appears.


Barcode Scanner
Scanner Enabled
Scan Data: 012345678905
Code Type: UPC/EAN
Enter = Continue
Cancel = Exit
Scan data and code type (format in which data was encoded) is read from barcode and displayed on screen.

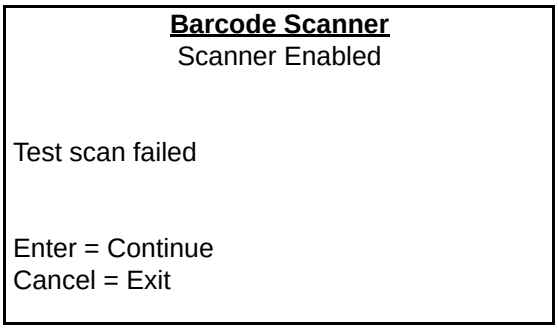
4 To return to the Barcode Scanner interactive test screen, press **Enter**.

~ OR ~

To exit to the initial Barcode Scanner test menu, press **Cancel**.

Barcode Scanner Test Failure Screen

The following screen appears when the barcode scanner interactive test operation times out after waiting 60 seconds for valid barcode data. The screen lets the technician know that the scanner laser should be off, and the scan session has been stopped.

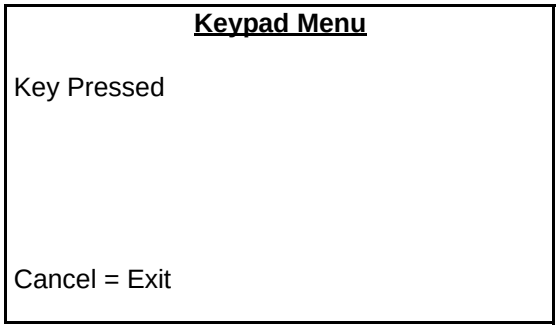


- Press **Enter** to return to the Barcode Scanner test menu.
- Press **Cancel** to return to the Barcode Scanner main menu.

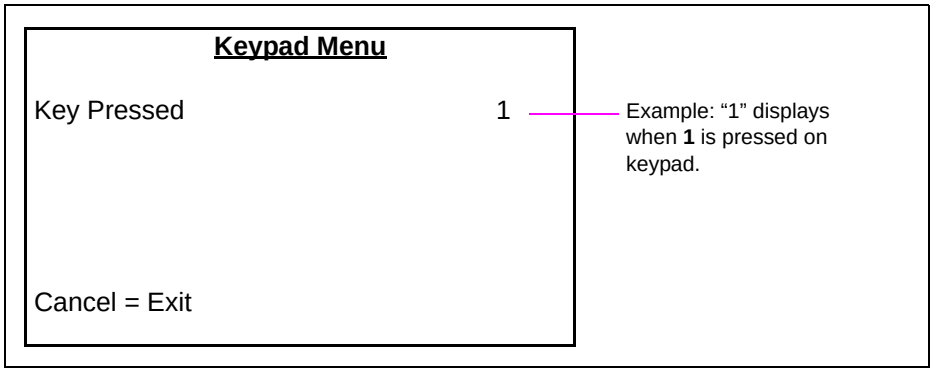
Keypad

The keypad menu displays a unique code in real-time for each key that is pressed.

1 From the Device Config menu, press **8**. The following screen appears.



2 Press a key on the keypad, to display the value of that key.



The **Cancel** key differs from other keys in that it displays “Cancel - exiting” and then the screen exits back to the Device Config menu.

The **F4** key differs from other keys in that it displays “F4” and then the screen exits back to the Device Config menu.

6 – Electronic and Electrical Components

About this Section

Important Information about Releases

Sections of this manual may be released independently of each other to supply the most current data. Information about release date and version for independently released sections will be included in the section title and footer of the document. Refer to the Gilbarco Online document resource "GOLD" for the latest update.

This section was last updated in August 2007.

Topics in this Section

Topic	Page
About this Section	6-1
About Service Procedures	6-3
Printed Circuit Assemblies and Nodes	6-5
Power Supplies	6-71
Displays, Main/PPU/CRIND	6-85
CRIND Devices	6-98
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VaporVac Electrical Components	6-115

Section Overview

This section provides information on the electronics and electrical components contained within the pumps and dispensers. This information may consist of an illustration of the component, functional description and where applicable, data on connections, test points and settings.

How to Use this Section

Refer to Topics in this Section for a listing of topics contained in this section and its location. Under each of the main topics is a table that lists individual components. Use this table to find information on a specific component. Additionally, the index and table of contents can be used to locate information.

Abbreviations and Acronyms

Term	Description
CRIND	Card Reader in Dispenser
LON	Local Operating Network
MIP	Microprocessor Interface Program
MOC	Major Oil Company
PCA	Printed Circuit Assembly
PCB	Printed Circuit Board
POS	Point of Sale
USB	Universal Serial Bus

Terms Used in this Section

Term	Definition
LON	Local Operating Network - This is a hardware and software system devised by the Echelon company for coordinating distributed control systems, from something as small as a copying machine, to large building utility systems such as Elevators, Fire Alarms, and so on. All reference to LON in this manual refers to systems inside the dispenser electronics.
PCA	Printed Circuit Assembly - This is a dedicated component designed for specific function with limited or non-existent intelligence or processing power. Refer to '"Printed Circuit Assemblies and Nodes" on page 6-5' for comparison. This term may be used interchangeably with PCB.
PCB	Printed Circuit Board - This is a dedicated component designed for specific function with limited or non-existent intelligence or processing power. Refer to "Printed Circuit Assemblies and Nodes" on page 6-5 for comparison. This term can be used interchangeably with PCA.
MIP	Microprocessor Interface Program - Allows all of the nodes to communicate together
Neuron	A low level processor found on all nodes. Its primary function is handling communication between higher level processors. The CRIND device and pump nodes contain this kind of higher level processors.
Nodes	Nodes contain intelligence (a processor or 'neuron' and connect to one or more peripheral boards). Nodes communicate with each other over the LON. See Note: below.
RX	Receiving data
TX	Transmitting data
Watchdog	Monitors and resets processor in the event of a system hang-up.

Note: In and out LON cable connection on nodes are not critical as there is no specific in or out. Where a side's identity is critical, the node involved will have an identifying jump jack, so that the system can determine if it is related to side 1 or side 2.

About Service Procedures

⚠ WARNING

You are performing inspections and maintenance in a potentially dangerous environment of flammable fuels/vapors and high voltage.

Fire, explosion or electrical shock could result in severe injury or death if you do not follow safe procedures. Read and follow all safety precautions.

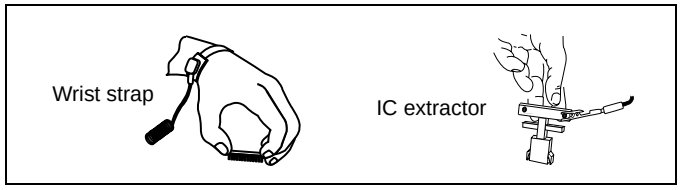
Working on Electronic and Electrical Components

Explosive vapors or liquids may be present in and around fuel dispensing equipment that can be ignited by electrical arcs or static electricity discharges. A potential shock hazard exists when working with this equipment. Additionally, static electricity discharges can damage sensitive electronic components. Follow all precautions and recommendations.

Preparing for Service

- Barricade area that you will be working in.
- Remove all power to unit when servicing electronic components. Remove power from involved devices, STPs, and so on. Multiple disconnects may be required.
- Use extreme caution during any observation or testing procedure that requires power to be applied to the unit.
- Follow Electrostatic Discharge (ESD) procedures to prevent damage to electronic components or ignition of flammable fuels or vapors.

Preventing Electrostatic Discharge



Printed Circuit Assemblies (PCAs) and Integrated Circuits (ICs) are sensitive to electrostatic discharge caused by static electricity. Electrostatic discharge can damage electronic parts. When removing PCAs or handling sensitive parts:

- Touch an unpainted metal surface to discharge any static electricity buildup.
- Use a wrist strap connected to a grounded metal frame or chassis.
- Place removed PCAs or ICs on a grounded antistatic mat.
- Use an IC extractor tool to remove ICs.
- Place PCAs you plan to return for credit or repair in antistatic bags.

Hazardous Materials

Some materials present inside electronic enclosures may present a health hazard if not handled correctly. Ensure that you clean your hands after handling equipment. Do not place any equipment in mouth.

⚠ WARNING

This area contains a chemical known to the State of California to cause cancer.

⚠ WARNING

This area contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Laser Light Energy

Scanners emit laser light that can damage eyesight when viewed directly.

⚠ WARNING

Laser light is used in this product and may present an eye hazard during service.
Direct viewing of laser light may damage eyesight.
Avoid long term viewing of direct laser light.

Replaceable Batteries

Some printed circuit boards contain replaceable batteries. Ensure that you insert batteries correctly.

WARNING

There is a danger of explosion if battery is replaced incorrectly. Replace with only the same or equivalent recommended type. Dispose of used batteries according to the battery manufacturer's instructions.

Replacing Fuses

CAUTION

Using an incorrectly sized fuse may cause equipment damage. To ensure good equipment protection and maintain safe operation, always use the correct replacement fuse.

Helpful Service Information

For Printed Circuit Assemblies (PCAs), Printed Circuit Boards (PCBs), and Nodes where applicable:

- Cable connectors are labeled with the destination of the cable.
- Test Points are clearly labeled and recessed to facilitate use of meter probes.
- Test point label usually indicates acceptable range, that is 4.8 - 5.2 VDC.
- LED Status Code - Where applicable, refer to LED Status description that is included with other board information.

Printed Circuit Assemblies and Nodes

Components in this Sub-Section

Part Number and Description	Model	Page
M00044A001 Terminal Block PCA (Encore 500/Eclipse)	Encore 500 and Eclipse	6-6
M00047A001 STP Driver PCA		6-7
M00056A001 Pump Control Node-1		6-8
M00059A00X Valve Driver PCA		6-13
M00062A001 Door Node-1		6-15
M00077A001 Totalizer Node		6-19
M00089A001 CRIND Control Node-1		6-23
M00092A001 Monochrome Interface PCA		6-28
M00122A001 LON to Serial Node (LON Gateway)		6-29
M01546A001 Hydraulic Interface PCA	Encore 300	6-31
M01549A001 Steering Valve Relay PCA		6-37
M01564A001 Grade Select PCA		6-39
M01598A001 Pump Controller PCA		6-40
M01621A001 Totalizer Interface PCA		6-43
M01753A001 CRIND Control Node-2	Encore 500 and Eclipse	6-45
M01785A001 Door Node-2		6-49
M01922A001 Pump Control Node-2		6-53
M02044A001 Valve Converter PCA		6-56
M02097A001 Steering Valve Relay PCA	Encore 300	6-57
M02335A001 Valve Converter PCA		6-58
T17764-G3/4 CRIND Z180 Logic Board		6-60
T19501-G2 Monochrome CPU PCA		6-67
T20306-G1 CRIND Regulator PCA		6-69

About Nodes

Encore 500 and Eclipse nodes communicate over a LON within the dispenser or pump. The nodes receive power and data from the LON bus (discrete cable). All nodes, except for the printer node have downloadable software. The nodes appear to be connected serially but are actually a parallel circuit. LON terminators must be located at the end of the LON run for the system to work correctly.

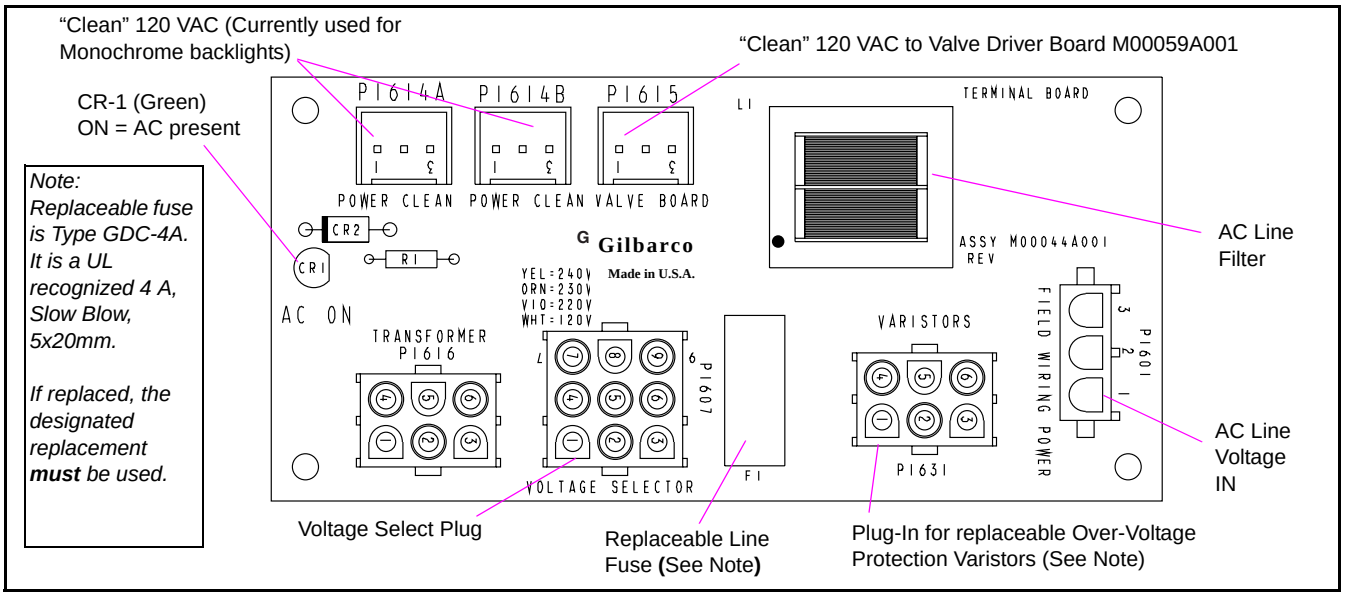
About PCAs

Printed Circuit Assemblies (PCA) and Printed Circuit Boards (PCB) control the hydraulics, monitor fuel delivery, compute, display, and store, transaction information, interface, with the Point of Sale (POS) device and support, payment options. The term PCA and PCB may be used interchangeably. Encore 500 and Eclipse employ a LON and Nodes to provide various functional information that drive operations throughout the unit. Nodes generally contains a processor.

M00044A001 Terminal Block PCA (Encore 500/Eclipse)

This board serves as the unit's field wiring terminal. Field connection received at this board includes AC power (hot, neutral and ground). This board was obsoleted by M02274 Power Supply.

Figure 6-1: Terminal Block Board M00044A001



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P1601 (3 pin)	M00153A1001	Field Wiring Power	Field wiring on terminal block
P1607	None - Plug In	Voltage Program Plug: • M00488A115 (115 VAC) • M00488A220 (220 VAC) • M00488A230 (230 VAC) • M00488A240 (240 VAC)	9 Pin
P1614A (3 pin)	M00630A003 (Encore) M00630A004 (Eclipse)	Side 1 Backlight, Ballast and Heater via J1614C to P1614C on M01103A001 cable	3 pin series
P1614B (3 pin)	M00630A003 (Encore) M00630A004 (Eclipse)	Side 2 Backlight, Ballast and Heater via J1614C to P1614C on M01103A001 cable	3 pin series
P1615 (3 pin)	M00625A001 to J1206/ P1206 connection to M01006A001 cable	1. Transformer Card Reader Heater Sub-Assembly M00293A001 2. M00059A00X Steering Valve Driver PCA	1. N/A 2. P1206 (3 pin)
P1616 (6 pin)	Multiple Colored Wires	Primary on Power Supply	
P1631 (6 pin)	None - Plug In	Varistor Assembly: • M00487A115 (115 Volt application) • M00487A230 (115 Volt application) • M00487A231 (115 Volt application)	6 pin Plug In

Note: If electronics are damaged due to power surge (for example, lightning), the varistor should be replaced.

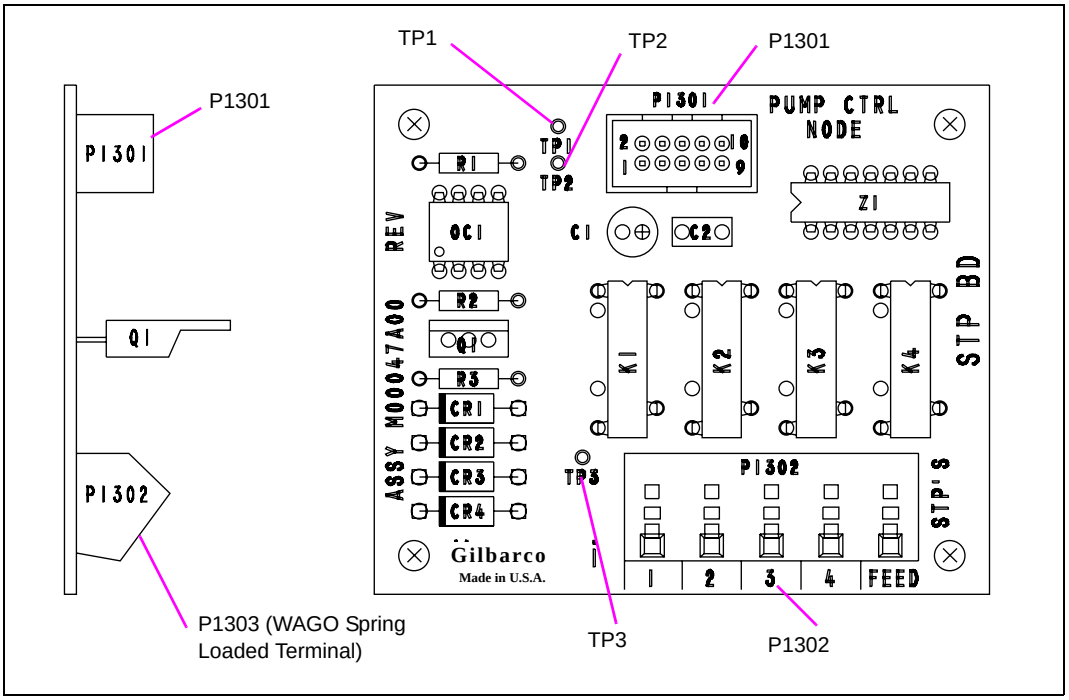
M00047A001 STP Driver PCA

STP Driver Board receives line voltage from M00044A001 Terminal Block PCA (Field Wiring). It receives control signal from M00056A001 or M01922A001 Pump Nodes, Totalizer Node and activates STP output signal relays.

Service Tip

Use caution during service when positioning the metal shield over this and other components. If the shield is not positioned correctly, it can short on board components to ground and permanently damage the board.

Figure 6-2: STP Driver Board M00047A001



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P1301 (10 pin)	M00635A001	M01922A001 or M0056A001 Pump Node	P1101 (10 pin)
P1302	1. STP Control Out (Field) 2. Feed, In	1. Field Wiring. Refer to: • FE-340 Field Wiring Diagram for Encore • FE--341 Field Wiring Diagram for Eclipse 2. Field Wiring	1. 4 Outputs 2. Terminal Block or Field Wiring

Test Points

Test Point	Range
TP 1	+5 VDC
TP 2	DC GRND
TP 3	STP Feed Voltage

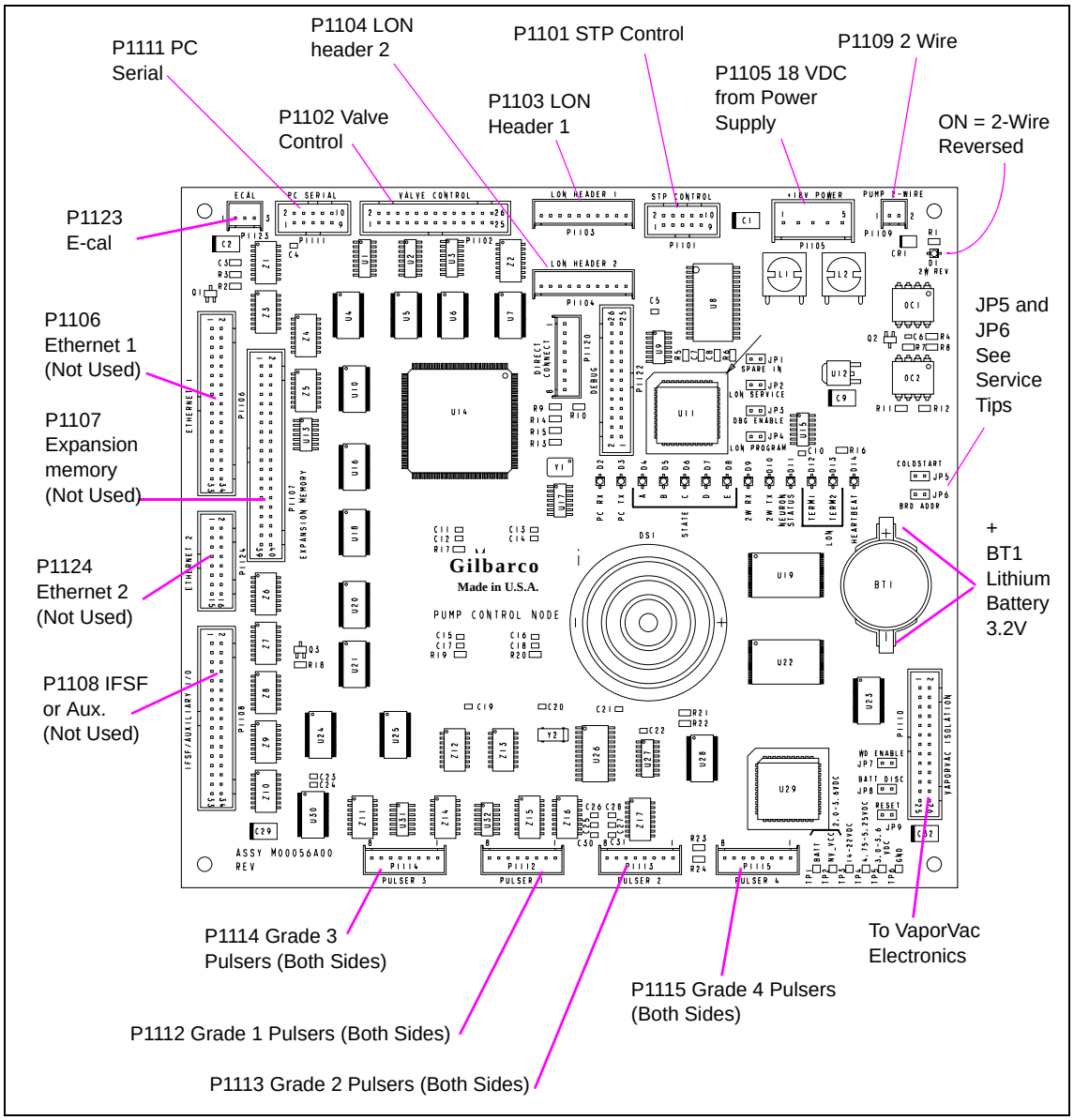
M00056A001 Pump Control Node-1

The main purpose of the first generation pump control node is to provide control for fueling. This board drives the LON, stores the operating system, configuration (programming), and one “complete” set of totals and operational logs. The Pump Control Node connects directly to the LON, Valve Driver Board, Pulsers, the STP driver board, the POS two-wire, PC serial port, VaporVac and also connects to the Weights and Measures E-cal switch. For non-eCRIND units, the Pump Control Node provides the main processing power for system. The lithium battery on this board maintains Level 1 and Level 2 programming.

Service Tips

- The coldstart jumpers only reset the processor of Level 1 and Level 2 programming. To completely reset the board (cold/coldstart), it is necessary to load V1.3.74 software and then load the latest version of software. Cold/Coldstart clears all programming, the clock, totals, calibration, and resets the processor.
- Software version V1.5.40 or later provides redundant storage of programming information. Two door nodes and one pump node are required to maintain redundancy storage. Never replace two of these boards at the same time or redundant storage may be lost.
- The LON circuit must have a terminator at the last node.
- Pump Control Node-1 is interchangeable with Pump Control Node-2. Certain features, such as USB, may be lost.
- Some nodes list TP3 voltage as 14-22 VDC but 14-28 VDC is also acceptable.
- Pump software must be loaded through the CRIND node or a temporary bridge pump node.
- The pump nodes contain two software types: Pump MIP and Pump Node software.
- The pump 2-wire transmit (TX) LED may flash under certain circumstances when the pump node is not transmitting.

Figure 6-3: Pump Control Node-1 PCA

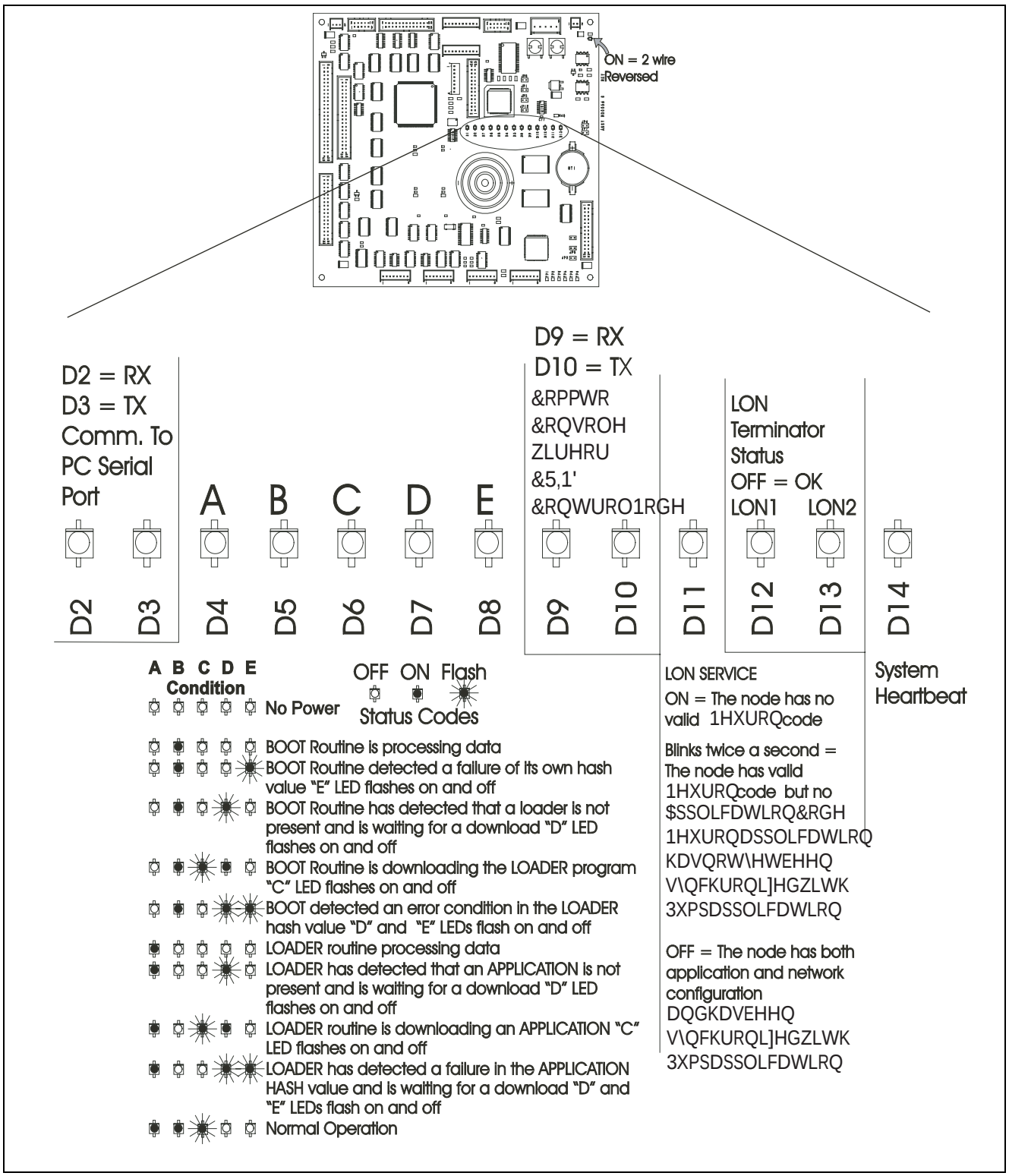

P1111 PC Serial
P1104 LON header 2
P1101 STP Control
P1109 2 Wire
P1105 18 VDC from Power Supply
P1103 LON Header 1
P1102 Valve Control
ON = 2-Wire Reversed
P1123 E-cal
P1106 Ethernet 1 (Not Used)
JP5 and JP6 See Service Tips
P1107 Expansion memory (Not Used)
+ BT1 Lithium Battery 3.2V
P1124 Ethernet 2 (Not Used)
P1108 IFSF or Aux. (Not Used)
Gilbarco
Made in U.S.A.
PUMP CONTROL NODE
P1114 Grade 3 Pulsers (Both Sides)
To VaporVac Electronics
P1115 Grade 4 Pulsers (Both Sides)
P1112 Grade 1 Pulsers (Both Sides)
P1113 Grade 2 Pulsers (Both Sides)

Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P1112-P1115 (Qty 4; 8 pin)	• M00453A001 (Encore, quad) • M01026A001 (Eclipse) • T18350-G6 (Encore, requires V1.6.00 or later software)	Pulser(s)	
P1101 (10 pin) - STP Control	M00635A001	STP Board M00047	P1301
P1102 (26 pin) - Valve Control	M00549A001	M00059A00X Steering Valve Driver PCA	P1201
P1103 - LON Header 1	M02235 (LON Header 1: 10 pin)	LON system, Side 1	
P1104 - LON Header 2	M02235 (LON Header 2: 10 pin)	LON system, Side 2	
P1105 (5 pin) - 18 VDC from power supply	M00635A001	M00050A001 Power Supply Board 18 VDC	P1402
P1106 (34 pin) Ethernet 1	(not used)		
P1107 (Expansion Memory)	(not used)		
P1108 (34 pin) IFSF or Aux.	(not used)		
P1109 (2 wire)	M00491A001	Pump 2-Wire: • To Terminal Block in Power Supply (Stand alone or generic CRIND) ~ OR ~ • M00089A001 CRIND Control Node (MOC CRIND) ~ OR ~ • MOC special CRIND Control Node M00089G001 (See M00089A001 CRIND Control Node)	
P1110 (26 pin)	M00549A002 (Encore) M01036A001 (Eclipse)	M00080 VaporVac Isolation PCB	P1405
P1111 (10 pin) - PC serial (signals to Valve Driver PCA)	M00719A001	Serial Programming Port	
P1120 Direct Connect	(not used)		
P1122 Debug	(not used)		
P1123 (3 pin) E-cal	M00150A001 (Encore) M00150A002 (Eclipse)	E-cal Security Switch	(3)
P1124 (16pin) Ethernet 2	(not used)		

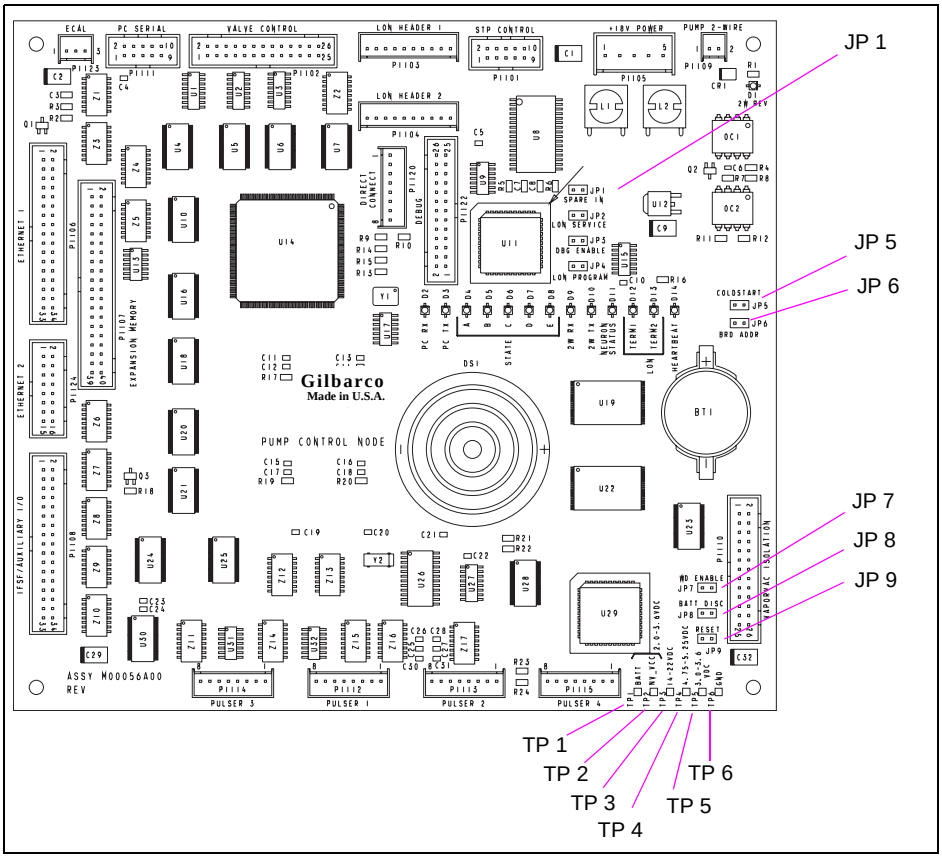
Status LEDs

Figure 6-4: Pump Control Node LCD Nomenclature


ON = 2 wire
Reversed
D2 = RX
D3 = TX
Comm. To
PC Serial
Port
A B C D E
D9 = RX
D10 = TX
&RPPWR
&RQVROH
ZLUHRU
&5,1'
&RQWURO1RGH
LON
Terminator
Status
OFF = OK
LON1 LON2
D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14
A B C D E
Condition
OFF ON Flash
Status Codes
No Power
BOOT Routine is processing data
BOOT Routine detected a failure of its own hash value "E" LED flashes on and off
BOOT Routine has detected that a loader is not present and is waiting for a download "D" LED flashes on and off
BOOT Routine is downloading the LOADER program "C" LED flashes on and off
BOOT detected an error condition in the LOADER hash value "D" and "E" LEDs flash on and off
LOADER routine processing data
LOADER has detected that an APPLICATION is not present and is waiting for a download "D" LED flashes on and off
LOADER routine is downloading an APPLICATION "C" LED flashes on and off
LOADER has detected a failure in the APPLICATION HASH value and is waiting for a download "D" and "E" LEDs flash on and off
Normal Operation
LON SERVICE
ON = The node has no valid 1HXURQcode
Blinks twice a second = The node has valid 1HXURQcode but no $SSOLFDWLRQ&RGH
1HXURQDSSOLFDWLRQ KDVQRW\HWEHHQ V\QFKURQL]HGZLWK 3XPSDSSOLFDWLRQ
OFF = The node has both application and network configuration
DQGKDVEHHQ V\QFKURQL]HGZLWK 3XPSDSSOLFDWLRQ
System
Heartbeat

Test Points and Jump Jacks

Figure 6-5: Pump Control Node Jump Jack



Test Points

Test Point	Range
TP 1	Battery 2.0 to 3.6 VDC
TP 2	NV_VCC
TP 3	14 to 22.8 VDC
TP 4	4.75 to 5.25 VDC
TP 5	3.0 to 3.6 VDC
TP 6	GND

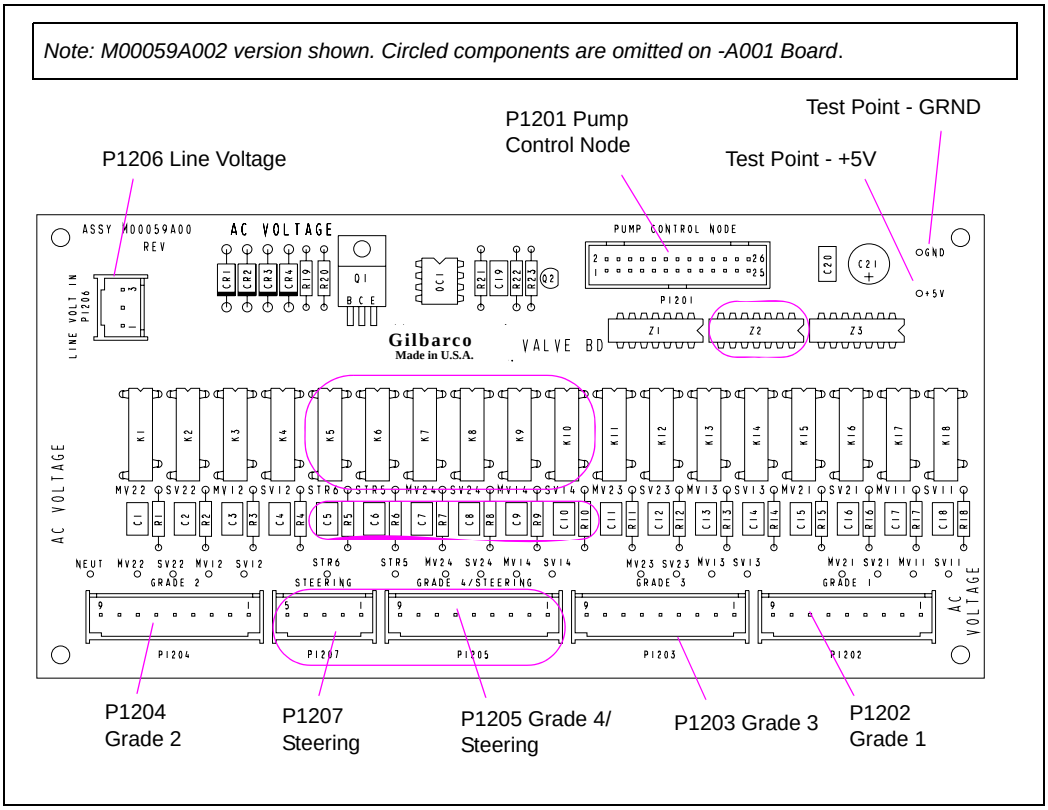
Jump Jacks

Jumper	Description
JP 1	NA
JP 5	Coldstart (if available) (see “Service Tips” on page 6-8)
JP 6	Board Address (IN) suppresses minor nuisance error codes, but still recorded in Event Logs.
JP 7	Watchdog Enable (always IN)
JP 8	Disconnect Battery (if IN: NVRAM is NOT battery backed - preserves power)
JP 9	Resets Processor - short with power on (if available)

M00059A00X Valve Driver PCA

M00059A001 Board is standard for Encore 500 and Eclipse with digital valves. M00059A002 is a fully loaded version for 4-Grade and steering valve equipped units (multi-hose blenders). The board drives all valves and senses current through the valves for automatic configuration and error code generation. It receives its signal from the pump node and filtered AC power from M00044A001 Terminal Block PCA. It is not used with Proportional Flow Control Valves (PFCV).

Figure 6-6: Steering Valve Driver Board M0059A00X


Note: M00059A002 version shown. Circled components are omitted on -A001 Board.
P1206 Line Voltage
P1201 Pump Control Node
Test Point - +5V
Test Point - GRND
P1204 Grade 2
P1207 Steering
P1205 Grade 4/ Steering
P1203 Grade 3
P1202 Grade 1

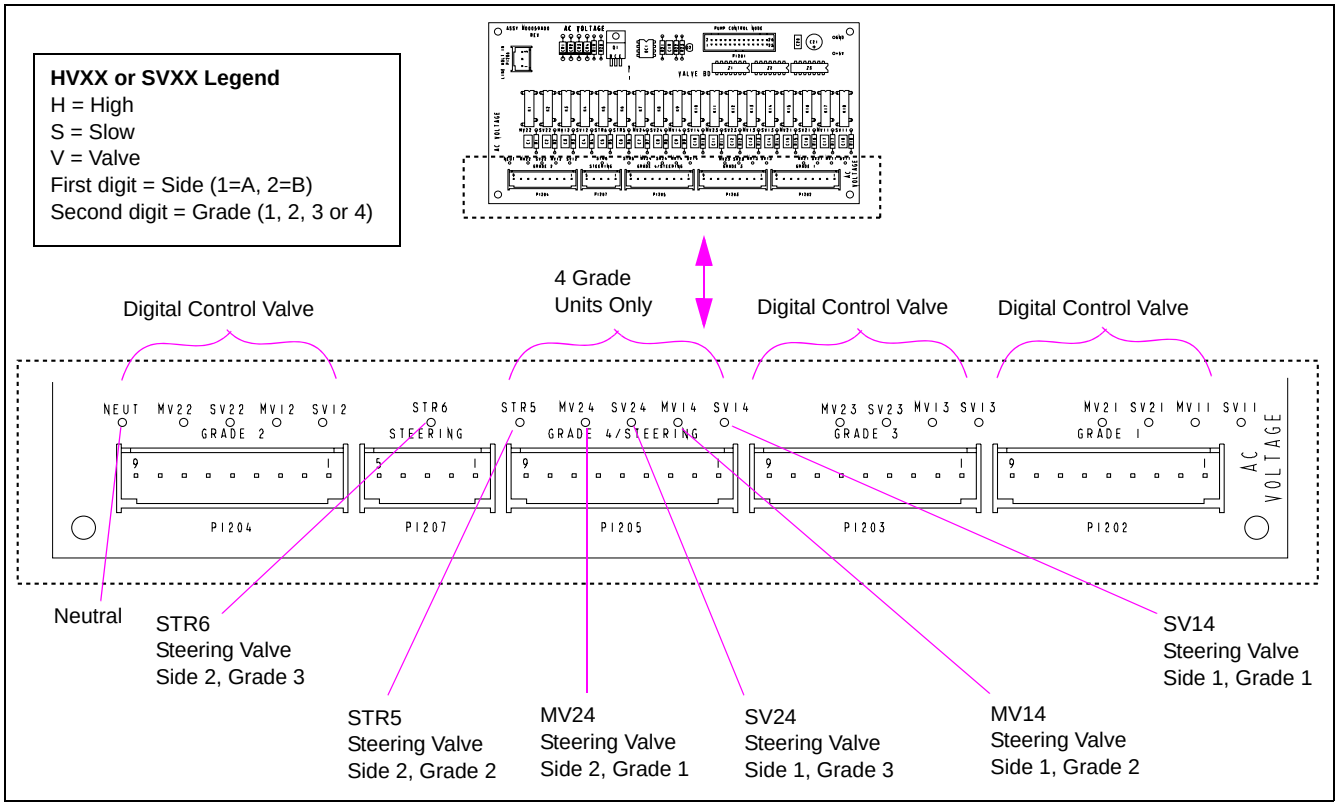
Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P1201 (26 pin) Pump Control Node	M00549A001	M01922A001 or M00056A001 Pump Node	P1102 (26 pin)
P1202 (9 pin) Grade 1	Dedicated Cables: • M00454A002 (Encore) • M00724A001 (Eclipse)	Slowdown Valve and Main Valve 11 + 21	
P1203 (9 pin) Grade 3		Slowdown Valve and Main Valve 13 + 23	
P1204 (9 pin) Grade 2		Slowdown Valve and Main Valve 12 + 22	
P1205 (9 pin) Grade 4/Steering		Slowdown Valve and Main Valve 14 + 24	
P1206 (3 pin)	M00625A001 (Inline connection J1206 to P1206 on cable M01006A001 on Eclipse only)	M00044A001 Terminal Block PCA	P1615 (3)
P1207 (5 pin) Steering 6-Hose Fixed Blender	M01339A001	M00223B002 Steering Valve coils	J701

Test Points

Reference Figure 6-7 for location of test points (all relays K1-K18 are installed). The A001 board does not provide G4 and steering valve control. As a result, not all test points shown in Figure 6-7 are applicable.

Figure 6-7: Test Points on A002 Version



M00062A001 Door Node-1

The first generation Door Node (M00062A001) is for use with Encore 500 and Eclipse with Steering Valves only. This node provides an interface for inputs and outputs from the customer and acts as the interface to many of the devices that are found on the door. The door node also provides sales totals to the customer. There are two generations of door nodes which are interchangeable. The first generation node, shown in Figure 6-8 on 6-16, has more connectors and some additional components not seen on the second generation node. There is no loss in features in the second generation node.

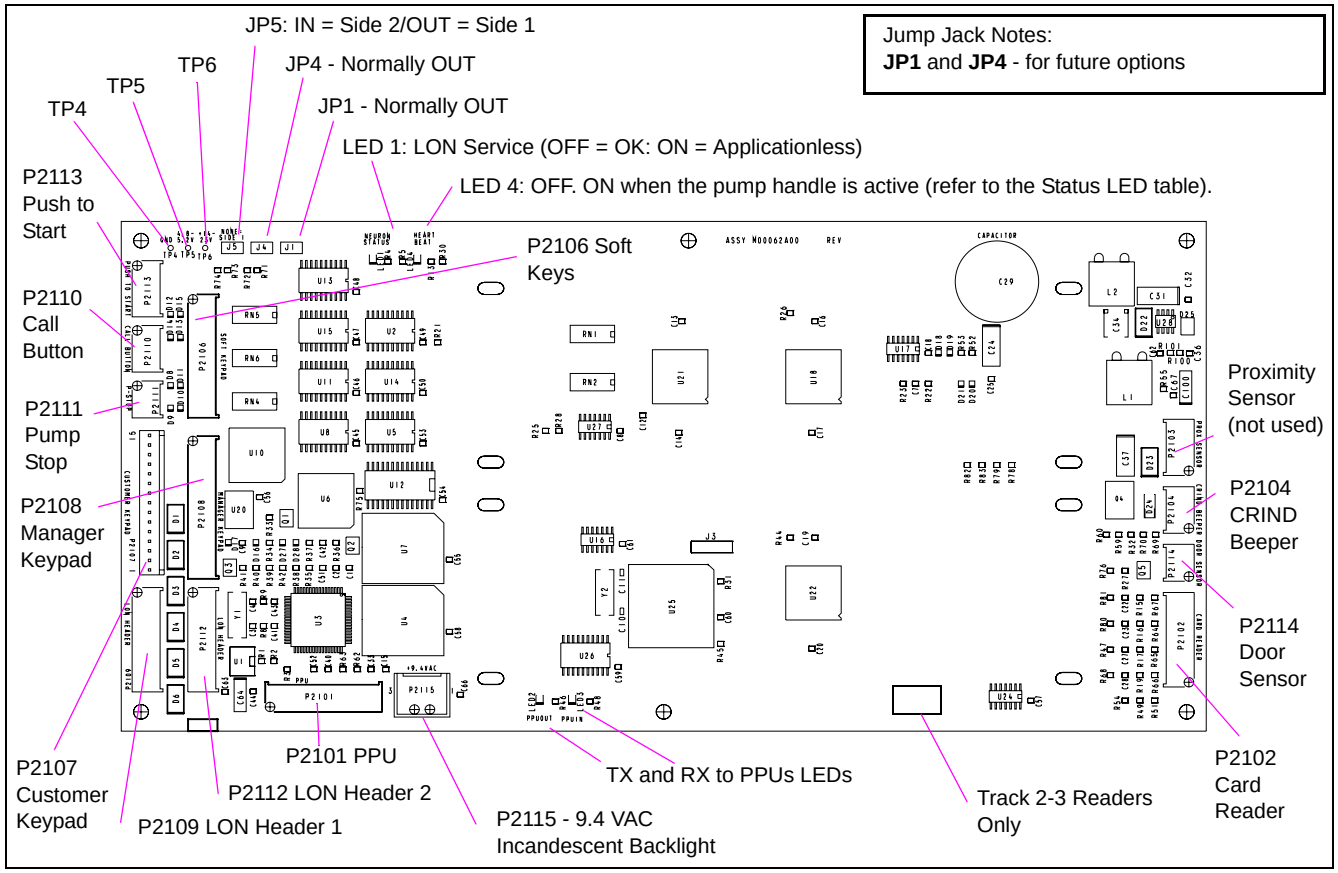
The door node is part of the LON system and many devices normally found on the door will connect to the node and pass information on via the LON. Devices directly or indirectly connected to the Door Node are:

- Push to Start, Call and Pump Stop Buttons
- Customer (CRIND) keypad
- Manager Keypad (Side 1 only)
- Indirectly: handle switches and grade select switches through PPU Board
- Soft Keys: Monochrome and Color eCRIND
- Beeper (Speaker)
- Door Sensor (security)

Service Tips

- For software version V1.5.40 or later Pump Node software the door node provides redundant data storage. Do not replace more than one pump or door node at a time or redundant data storage may be lost.
- Always replace incandescent lamps as a set.

Figure 6-8: Door Node M00062A001



Status LEDs

LED	Status Indication
1	LON (Neuron) Status - ON or blinking indicates LON or Node problem
2	TX or PPU-OUT indicates communication to PPU boards
3	RX or PPU-IN indicates communication from PPU boards
4	OFF. ON when the pump handle is active

Test Points

Test Point	Range
TP4	GRND
TP5	4.75 V to 5.25 VDC
TP6	+14 V to +28 VDC

Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P2101 (11 pin)	• M00509A001 or M00509A002 for Encore • M00509A003 for Eclipse	M02652A00X PPU board (one per grade)	P2201
P2102 (9 pin)	• M00501A001 (Encore) • M00501A002 (Eclipse)	Card Reader	
P2103 (5 pin)	(not used)		
P2104 (4 pin)	• M00636A001 (Encore) • M00495A001/ M00636A002 (Eclipse)	Beeper (refer to the Encore Series Cable Block Diagram or the Eclipse Series Cable Block Diagram).	
P2106 (12 pin)	M01200A001	Soft Keys Keypad (see Encore Cable Block Diagram M00284)	
P2107 (15 pin)	M01202A001 (Encore M01202A002 (Eclipse)	Customer Keypad Options (CRIND or PPP): • M01109 Misc Options Keypad • M00141 CRIND Keypad	Refer to MDE-3804B Wiring and Configuration Manual
P2108 (14 pin)	M00515A001 (Encore) M00515A003 (Eclipse)	M00147 Manager Keypad (Side 1 only)	
P2109 (10 pin)	M00489/M02235	LON Bus 1	
P2110 (4 pin) [Call Button]	M01201A001 (Encore) M01215A001 (Encore)	M01109B001 Miscellaneous Options	12 pin
P2111 (3 pin) [Push to Stop]			
P2113 (5 pin) [Push to Start]			
P2112 (10 pin)	M00489/M02235	LON Bus 2	
P2114 (4 pin)	N/A	Door sense	
P2115 (3 pin)	M00614A004 (Encore) M00614A002 (Eclipse)	Power Supply 9.4 VAC (PS2 to PS3 on bulkhead connector)	PS2

Connector Pin Functions and Voltages

P2101

Pin #	Description	Input /Output Voltage
1	+9.4 VAC	9.4 VAC +/-10%
2	+9.4 VACRTN	
3	GND	0 VDC
4	GND	0 VDC
5	DLT+5 VDC	+4.7 V +/-10% (with the power on)
6	PPUCLK	0 to 5 V
7	PPUFBDATA	0 to 5 V
8	PPUSND_REC	0 to 5 V
9	PPUBP	0 to 5 V
10	PPUSDATA	0 to 5 V
11	PPUSYNC	0 to 5 V

P2102

Pin #	Description	Input /Output Voltage
1	VCC	+5 V +/-5%
2	CRRDT1	0 to 5 V
3	CRRCL1	0 to 5 V
4	CRRDT2	0 to 5 V
5	CRRCL2	0 to 5 V
6	CRCLD	0 to 5 V
7	GND	0 V
8	CRSTAT	Open to 0 V
9	GND	0 V

P2103

Pin #	Description	Input /Output Voltage
1	VCC	+5 V +/-5%
2	GND	0 V
3	PRSENIN	0 to 5 V
4	PRSENSTAT	Open to 0 V
5	+18 VUNREG	+17.5 V to +28 V

P2104

Pin #	Description	Input /Output Voltage
1	VCC	+5 V +/-5%
2	SPKRTN	Open Collector to 0 V
3	SPKR_STAT	Open to 0 V
4	GND	0 V

P2109

Pin #	Description	Input /Output Voltage
1	+18 VUNREG	+17.5 V to +28 V
2	GND	0 V
3	+18 VUNREG	+17.5 V to +28 V
4	GND	0 V
5	485B	-7 V to +12 V Max.
6	485A	-7 V to +12 V Max.
7	GND	0 V
8	+18 VUNREG	+17.5 V to +28 V
9	EXTRESET	0 V to +12 V
10	TERM RES FEEDTHRU	

P2112

Pin #	Description	Input /Output Voltage
1	+18 VUNREG	+17.5 V to +28 V
2	GND	0 V
3	+18 VUNREG	+17.5 V to +28 V
4	GND	0 V

Pin #	Description	Input /Output Voltage
5	485B	-7 V to +12 V Max.
6	485A	-7 V to +12 V Max.
7	GND	0 V
8	+18 VUNREG	+17.5 V to +28 V
9	EXTRESET	0 V to +12 V
10	TERM RES FEEDTHRU	

P2115

Pin #	Description	Input /Output Voltage
1	+9.4 VAC	9.4 VAC +/-10%
2	+9.4 VACRTN	
3	No connect	

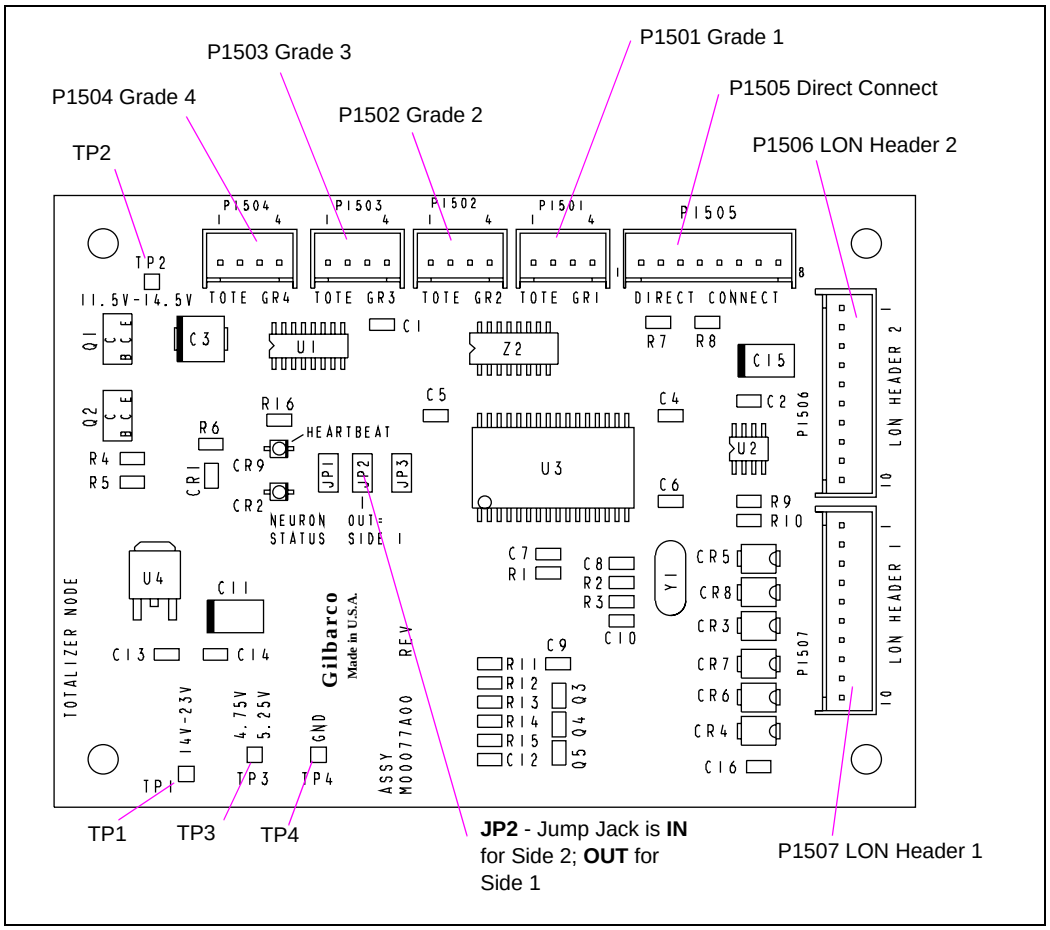
M00077A001 Totalizer Node

M00077A001 is a dedicated peripheral control node on the LON Bus for Encore 500 and Eclipse. This node is used to control a maximum of four electro-mechanical totalizers that may be found on one or both sides of the unit. Totals are non-changeable.

Totalizer operation can be programmed in select installed options: Command Code 91, at Function Code 11. Totalizer can be configured as:

- Per inlet per unit (only option available for the Eclipse model)
- Per product per side

Figure 6-9: Totalizer Node PCA M00077A001



Board Connections

Connector#	Via Cable	to Board
P1501 (4 pin)		Electronic Totalizer Grade 1
P1502 (4 pin)		Electronic Totalizer Grade 2
P1503 (4 pin)		Electronic Totalizer Grade 3
P1504 (4 pin)		Electronic Totalizer Grade 4
P1505 (8 pin)		N/A (not for field use)
P1506 (10 pin)	M00489	LON Header 2
P1507 (10 pin)		LON Header 1

Test Points

Test Point	Range
TP 1	17.5 to 28 V to GRND
TP 2	11.5 V to 14.5 V to GRND
TP 3	4.75 V to 5.25 V to GRND
TP 4	GRND

Status LEDs

LED	Status Indication
CR 2	LON (Neuron) Status - ON or blinking indicates problem
CR 9 *	HEARTBEAT - should blink at 1 per second

** Currently blinks every 5 seconds. In future, all Heartbeats should be consistent with each other.*

Connector Pin Functions and Voltages

P1501

Pin #	Description	Input /Output Voltage
1	TOTE_RETURN1	0 V to open collector
2	TOTE_DETECT1	0 to +5 V
3	+5 V	+5 V +/-5%
4	TOTE_FEED1	+13 V +/-10%

P1502

Pin #	Description	Input /Output Voltage
1	TOTE_RETURN2	0 V to open collector
2	TOTE_DETECT2	0 to +5 V
3	+5 V	+5 V +/-5%
4	TOTE_FEED2	+13 V +/-10%

P1503

Pin #	Description	Input /Output Voltage
1	TOTE_RETURN3	0 V to open collector
2	TOTE_DETECT3	0 to +5 V
3	+5 V	+5 V +/-5%
4	TOTE_FEED3	+13 V +/-10%

P1504

Pin #	Description	Input /Output Voltage
1	TOTE_RETURN4	0 V to open collector
2	TOTE_DETECT4	0 to +5 V
3	+5 V	+5 V +/-5%
4	TOTE_FEED4	+13 V +/-10%

P1505

Pin #	Description	Input /Output Voltage
1	CP0	Selectable Hysteresis
2	CP1	Selectable Hysteresis
3	CP2	0 to +5 V
4	CP3	0 to +5 V
5	RX_DISABLE	0 to +5 V
6	GND	0 V
7	No connect	
8	BOARD_RESET	0 to 0.7 V

P1506

Pin #	Description	Input /Output Voltage
1	+18 VUNREG	+17.5 V to +28 V
2	GND	0 V
3	+18 VUNREG	+17.5 V to +28 V
4	GND	0 V
5	485B	-7 V to +12 V Max.
6	485A	-7 V to +12 V Max.
7	GND	0 V
8	+18 VUNREG	+17.5 V to +28 V
9	EXTRESET	0 V to +12 V
10	TERM RES FEEDTHRU	

P1507

Pin #	Description	Input /Output Voltage
1	+18 VUNREG	+17.5 V to +28 V
2	GND	0 V
3	+18 VUNREG	+17.5 V to +28 V
4	GND	0 V
5	485B	-7 V to +12 V Max.
6	485A	-7 V to +12 V Max.
7	GND	0 V
8	+18 VUNREG	+17.5 V to +28 V
9	EXTRESET	0 V to +12 V
10	TERM RES FEEDTHRU	

M00089A001 CRIND Control Node-1

First Generation CRIND Control Node (CCN) M00089A001, found in the Encore 500 and Eclipse communicates through the LON. Major Oil Company (MOC) applications access this node by communicating through the two-wire. It controls the card reader, monochrome display, printer, bar code scanner, cash acceptor, TRIND, beeper and associated keypads. The lithium battery on this node maintains CRIND application software and CRIND Control Node programming. M00089A001 is replaced by M01753A001 CRIND Control Node-2. CCN-1 is interchangeable with CCN-2; however certain features, such as USB support will be lost. Additionally, the CCN-2 does not use a Monochrome Interface board.

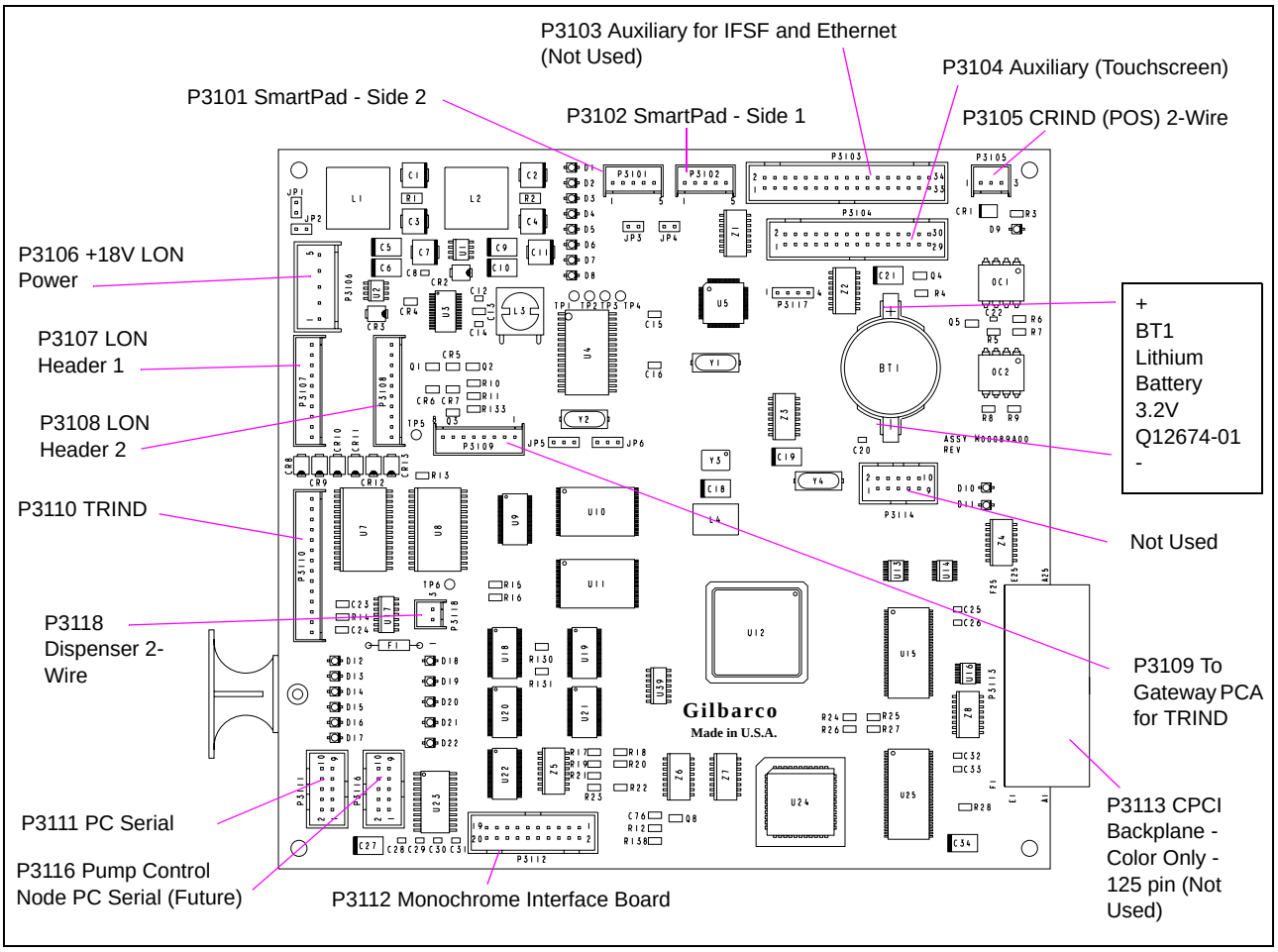
WARNING

There is a danger of explosion if battery is replaced incorrectly. Replace with only the same or equivalent recommended type. Dispose of used batteries according to the battery manufacturer's instructions.

Service Tips

- The Coldstart jumper does work for this board. A true Coldstart can be done using the diagnostic card and accessing the Clean Persistent Memory function.
- This board must be used with a Monochrome Interface board.
- CRIND MIP software must be loaded through the pump node.
- The CRIND node uses three types of software: CRIND MIP, CRIND Node and CRIND application from Point of Sale POS software.

Figure 6-10: CRIND Control Node M00089A001

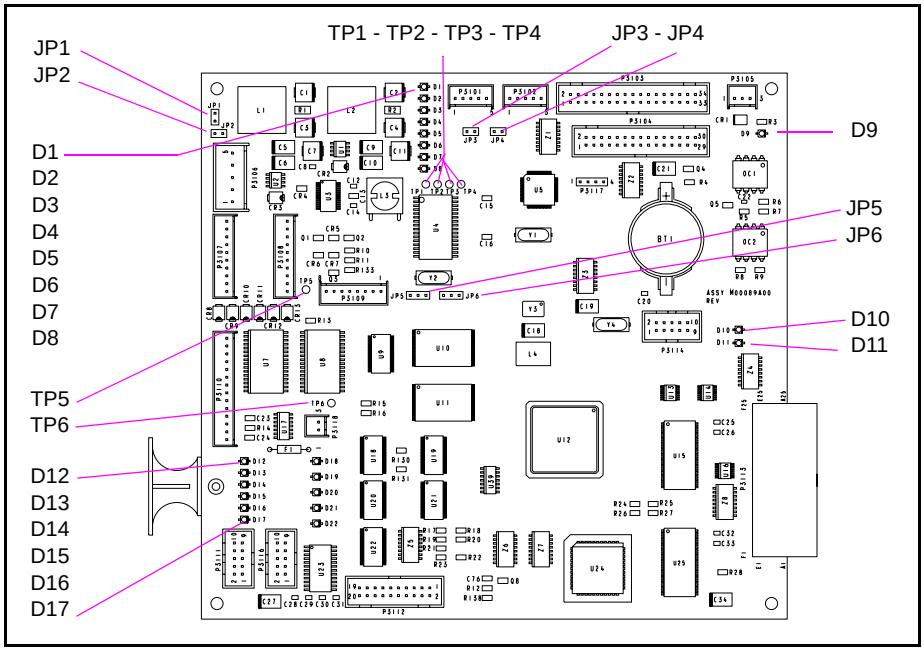

P3103 Auxiliary for IFSF and Ethernet (Not Used)
P3104 Auxiliary (Touchscreen)
P3101 SmartPad - Side 2
P3102 SmartPad - Side 1
P3105 CRIND (POS) 2-Wire
P3106 +18V LON Power
P3107 LON Header 1
P3108 LON Header 2
P3110 TRIND
P3118 Dispenser 2-Wire
P3111 PC Serial
P3116 Pump Control Node PC Serial (Future)
P3112 Monochrome Interface Board
+ BT1 Lithium Battery 3.2V Q12674-01 -
Not Used
P3109 To Gateway PCA for TRIND
P3113 CPCI Backplane - Color Only - 125 pin (Not Used)
Gilbarco
Made in U.S.A.

Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P3101 (5 pin)	M00497A002	SmartPad - Side 2	12 pin
P3102 (5 pin)	M00497A002	SmartPad - Side 1	12 pin
P3103 (34 pin)	M00716 A001	CRIND Auxiliary Board M00095A001	P3403 (34 pin)
P3104 (30 pin)	M00716A002		P3404 (30 pin)
P3105 (3 pin)	M00635A001	Terminal Block 2 in Power Supply (CRIND Retrofits Only)	
P3107 (10 pin)	M00489A001	LON Header 1	10 pin
P3108 (10 pin)		LON Header 2	10 pin
P3109 (14 pin)		TI Gateway PCA	J3110
P3110 (14 pin)	M00515A001	TRIND Gateway PCA	P250
P3111 (10 pin)	M00719A001 (Encore) M00719A002 (Eclipse)	Serial Programming Port (when available)	
P3112 (20 pin)	M00545A001	M00095A001 CRIND Auxiliary I/O Board	P3301
P3113 (125 pin)	M00101A001 CPCI Backplane Assembly (In Design)		
P3114 (10 pin)	not used		N/A
P3116	Serial Port on M00077A001 Totalizer Node (Future)		
P3118 (2 pin)	M00491A001	M00056A001 Pump Node M01922A001 Pump Node	P1109

Status LEDs, Jump Jacks and Test Points

Figure 6-11: CRIND Control Node Jump Jacks and Test Points



Jump Jacks

Jump Jack	Purpose/Status
JP1	Reset CRIND Control Node (only)
JP2	Coldstart (not yet available)
JP3	N/A (no field use)
JP4	
JP5	Selects type of communication between PCN (M00077A001 Totalizer Node) and CCN. • If JJ is installed on Pins 1-2, PCN and CCN communicate through 2-wire interface. • If JJ is installed on Pins 2-3, PCN and CCN communicate via PC serial interface (not available at this time).
JP6	Not populated; also part of PCN to CCN serial interface. • If JJ is installed on Pins 1-2, pump is set for 2-wire or PC serial without a Clear to send handshaking capability. • If JJ is installed on Pins 2-3, PC serial communications is set to use the Clear to send handshaking signal.

Test Points

Test Point	Range	Where Used
TP1	3.15 to 3.45 V	Memory Voltage
TP2	4.75 to 5.25 V	Logic Voltage
TP3	3.0 to 3.6 V (Battery)	Battery
TP4	GND	Common for DC Voltage
TP5	17.5 to 28 V	LON Voltage
TP6	2.0 to 3.6 V	RAM Voltage

LEDs

LED	COLOR	Status Indication
RED		
D1		Heartbeat - should blink at 1 per second
YELLOW		
D2		TX SmartPad Side 1
D3		RX SmartPad Side 1
D4		TX SmartPad Side 2
D5		RX SmartPad Side 2
RED		
D6		LON 1 Terminator
D7		LON 2 Terminator
D8		LON (Neuron) Service - ON or blinking indicates problem
D9		POS 2-Wire - reversed if ON
YELLOW		
D10 D11		POS 2-Wire
D12		TX TRIND
D13		RX TRIND
D14		TX PC Serial
D15		RX PC Serial
D16		TX Pump 2-Wire
D17		RX Pump 2-Wire

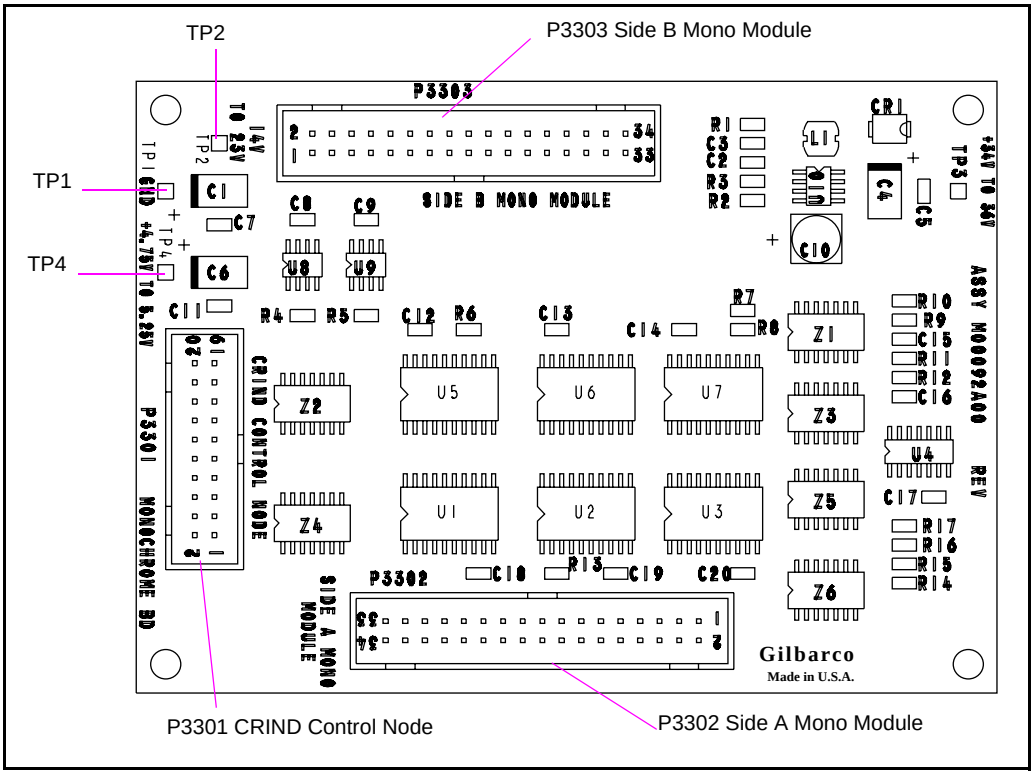
M00092A001 Monochrome Interface PCA

M00092A001 Monochrome Interface Board is used in the Encore 500 and Eclipse equipped with first generation CCN M00089A001. This interfaces displays signals from M00089A001 to side 1 and side 2 monochrome displays. This board is not required with CRIND Node-2.

Service Tip

A fault in this board may affect one or both monochrome displays.

Figure 6-12: Monochrome Interface Board M00092A001



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P3301 (20 pin)	M00545A001	M00089A001 CRIND Control Node	P3112 (20 pin)
P3302 (34 pin)	M00553A001 (Encore) M00553A002 (Eclipse)	Monochrome Module Side 1	J1 (34 pin)
P3303 (34 pin)	M00553A001 (Encore) M00553A002 (Eclipse)	Monochrome Module Side 2	J1 (34 pin)

Test Points

Test Point	Range
TP1	GND
TP2	14 V to 23 V
TP3	34 V to 36 V
TP4	4.75 V to 5.25 V

M00122A001 LON to Serial Node (LON Gateway)

The LON to Serial Node converts LON data to RS232 data on Encore 500 and Eclipse series units. RS 232 serial data is a protocol that allows the LON to interface with serial devices such as scanners and cash acceptors. This board is equipped with door indicator connections for security. This board contains a replaceable battery that allows for monitoring of the door indicator connections, even when power is disrupted.

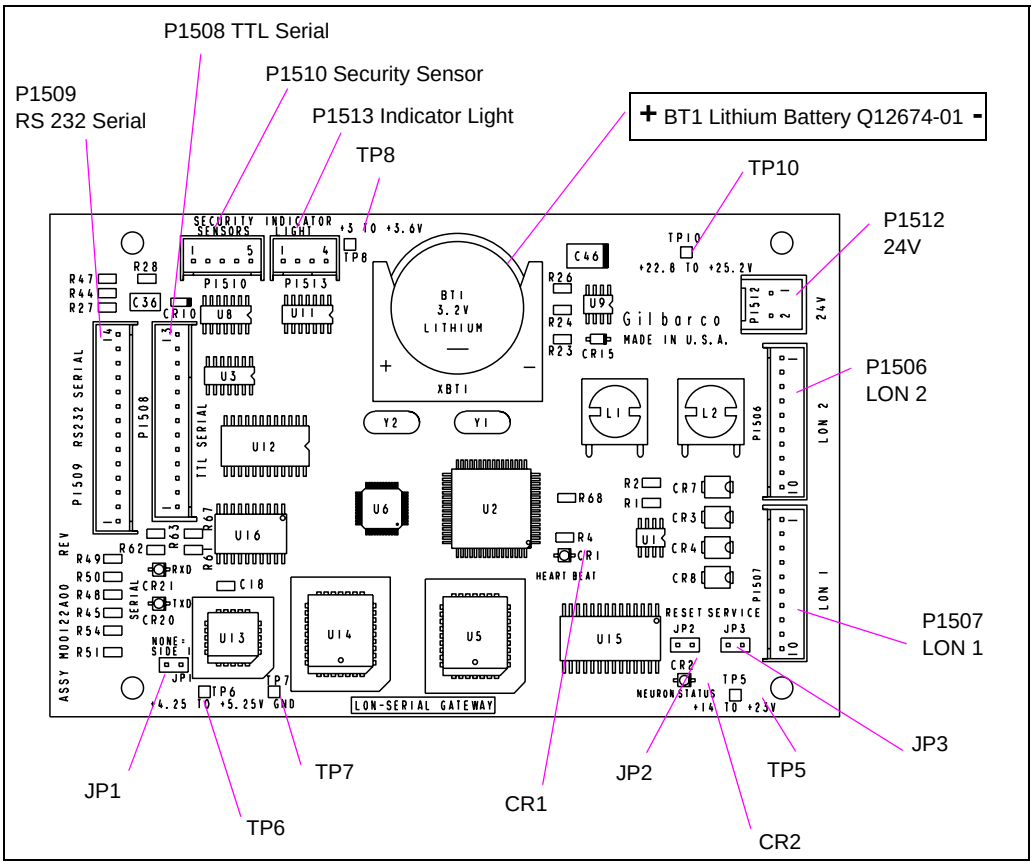
WARNING

There is a danger of explosion if battery is replaced incorrectly. Replace with only the same or equivalent recommended type. Dispose of used batteries according to the battery manufacturer's instructions.

Service Tips

- If the Neuron status LED is on or blinking, then there is a problem with the LON.
- Heartbeat LED should be blinking at a steady rate.
- Transmit and receive LEDs indicate communication on the RS 232 port.

Figure 6-13: LON to Serial Node



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P1506 (10 pin)	M00489	LON Header 2	
P1507 (10 pin)		LON Header 1	
P1508 (13 pin)	N/A	Cash Acceptor Interface	13 pin understand
P1509 (14 pin)	N/A	RS-232 Interface	14 pin
P1510 (5 pin)	N/A	Not available	
P1512 (2 pin)	N/A	M00053A002 Power Supply Board 24 VDC (Bar code only)	• P3503 A (Side 1) • P3503B (Side 2)
P1513 (4 pin)	N/A	Indicator (Bar code only)	

Test Points

Test Point	Range
TP5	17.5 V to 28 V
TP6	4.75 V to 5.25 V
TP7	GND
TP8	3.0 to 3.6 V (Battery)
TP9	11.4 to 12.6 V
TP10	22.8 to 25.2 V

Status LEDs

LED	Status Indication
CR 1	HEARTBEAT - should blink at 1 per second
CR 2	LON (Neuron) Status - ON or blinking indicates problem
CR 20	Serial TXD (ON when transmitting)
CR 21	Serial RXD (ON when receiving)

Jump Jacks

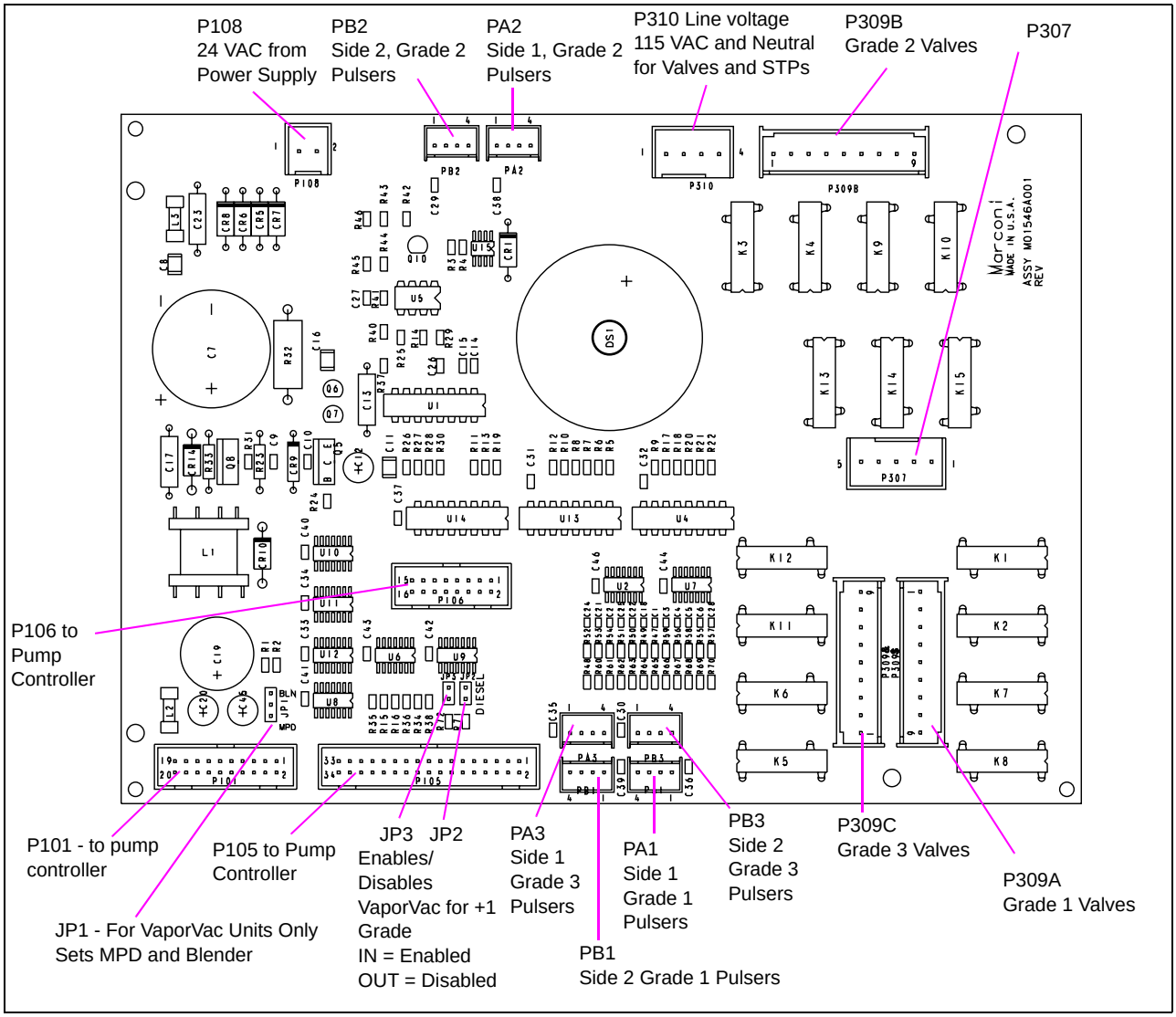
Jump Jack	Purpose/Status
JP1	Jumper for side 1. No jumper is side 1.
JP2	Reset
JP3	Not for field use

M01546A001 Hydraulic Interface PCA

This Hydraulic Interface board is used on Encore 300 series units with a digital valve. It interfaces with various devices such as pulsers, valves, VaporVac, and STP relays to the pump or dispenser electronics. This board provides a regulated 14.5 VDC for system operation, contains solid state relays that control solenoid valves, STP relays, and a pulser signal interface. This board also contains a buzzer and an interface to the VaporVac vapor recovery system.

The regulated 14.5 VDC has an under-voltage lockout circuit that prevents regulated power supply circuits from starting until the unregulated DC input voltage reaches approximately 23 VDC. This circuit also turns off regulated voltages when the unregulated DC input voltage drops to approximately 18 VDC.

Figure 6-14: Hydraulic Interface PCA - M01546A001



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
PA1 (4 pin)	R20462-G4	Pulser Assembly T18350-G5 - A1	P1 (4 pin)
PA2 (4 pin)		Pulser Assembly T18350-G5 - A2	
PA3 (4 pin)		Pulser Assembly T18350-G5 - A3	
PB1 (4 pin)		Pulser Assembly T18350-G5 - B1	
PB2 (4 pin)		Pulser Assembly T18350-G5 - B2	
PB3 (4 pin)		Pulser Assembly T18350-G5 - B3	
P101 (20 pin)	R17995-G7	M01621A001 Totalizer Interface PCA	P201 (20 pin)
P105 (34 pin)	R19667-G1		P205 (34 pin)
P108 (2 pin)	2 wire/24 VAC	M01608A00 Main Power Supply	2 wire
P307 (5 pin)	M01601A001	From Field Wiring	STP1/2/3
P309A (9 pin)	M00454A001	Valves A1/B1	
P309B (9 pin)		Valves A2/B2 (N/A for Dual)	
P309C (9 pin)		Valves A3/B3 (N/A for Dual and Quad)	
P310 (4 pin)	115 V Valve Feed	M01608A00 Main Power Supply	4 wire

Test Points - AC (Voltage Requirements)

Connector	Pin Number	Input	Range	Current
AC Voltage Requirements				
P108	1	24 VAC Feed	24 VAC +/- 5%	0.750 A
P108	2	24 VAC Return		
P101	16	5 V	5 V +/- 5%	.25 A
P310	1	115 VAC	115 VAC +/- 10%	.75 A
P310	2	AC Neutral	0 VAC	
P310	4	STP Feed	98 to 240 VAC	.75 A
DC Voltage Requirements				
P101	6	14.5 VDC	14.5 +/- 5%	0.500 A
P101	12	DC GND		

Jump Jack Settings

Used only for units with VaporVac.

Jump Jack	Function
JP1 - MPD	Enables A2 and B2 VaporVac
JP1 - BLENDER	Disables A2 and B2 VaporVac
JP2	IN Enables/disables for VaporVac +1 Grade, Side 1
JP3	IN Enables/disables for VaporVac +1 Grade, Side 2
** For units with VaporVac only*	

P105 Connector Pin Functions and Voltages

Pin #	Description	I/O	Max Lo	Min Hi
1	Slowdown Valve A1	I	1.00 VDC	3.50 VDC
2	Main Valve B3	I	1.00 VDC	3.50 VDC
3	Slowdown Valve A2	I	1.00 VDC	3.50 VDC

Pin #	Description	I/O	Max Lo	Min Hi
4	Main Valve B2	I	1.00 VDC	3.50 VDC
5	Slowdown Valve A3	I	1.00 VDC	3.50 VDC
6	Main Valve B1	I	1.00 VDC	3.50 VDC
7	Slowdown Valve B3	I	1.00 VDC	3.50 VDC
8	Main Valve A2	I	1.00 VDC	3.50 VDC
9	Slowdown Valve B2	I	1.00 VDC	3.50 VDC
10	Main Valve A3	I	1.00 VDC	3.50 VDC
11	Slowdown Valve B1	I	1.00 VDC	3.50 VDC
12	Pump Handle B2	I	1.00 VDC	3.50 VDC
13	Pump Handle B3	I	1.00 VDC	3.50 VDC
14	Pulser Data A3	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
15	Pump Handle B1	I	1.00 VDC	3.50 VDC
16	Pulser Data A3	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
17	Pulser Data A2	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
18	Pump Handle A3	I	1.00 VDC	3.50 VDC
19	Pulser Data A2	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
20	Pump Handle A2	I	1.00 VDC	3.50 VDC
21	Pulser _Data A1	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
22	Pump Handle A1	I	1.00 VDC	3.50 VDC
23	Pulser Data A1	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
24	Pulser Data B2	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
25	Pulser Data B2	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
26	Beeper A	I	1.00 VDC	3.50 VDC
27	Pulser Data B1	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
28	Pulser Data B3	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
29	Pulser Data B1	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
30	Pulser Data B3	O	0.10 VDC @ 20 μA	4.50 VDC @ 20 μA
31	STP 1	I	1.00 VDC	3.50 VDC
32	Main Valve A1	I	1.00 VDC	3.50 VDC
33	STP 2	I	1.00 VDC	3.50 VDC
34	STP3	I	1.00 VDC	3.50 VDC

P106 Connector Pin Functions and Voltages

Pin #	Description	I/O	Max Lo	Min Hi
1	Pulse B	O	0.10 VDC @ 20 µA	4.50 VDC @ 20 µA
2	Pulse B1	O	0.10 VDC @ 20 µA	4.50 VDC @ 20 µA
3	Connect	I	Feed through to pin 4	
4	Connect	O	Feed through to pin 3	
5	GND	O	0 VDC	0 VDC
6	GND	O	GND	
7	Pulse A1	O	0.10 VDC @ 20 µA	4.50 VDC @ 20 µA
8	Pulse A	O	0.10 VDC @ 20 µA	4.50 VDC @ 20 µA
9	VVac A4	O	GND	
10	VVac B3	O	0.10 VDC @ 20 µA	4.50 VDC @ 20 µA
11	VVac B2	O	0.10 VDC @ 20 µA	4.50 VDC @ 20 µA
12	VVac B1	O	0.10 VDC @ 20 µA	4.50 VDC @ 20 µA
13	VVac A2	O	0.10 VDC @ 20 µA	4.50 VDC @ 20 µA
14	VVac A3	O	0.10 VDC @ 20 µA	4.50 VDC @ 20 µA
15	VVac A4	O	GND	
16	VVac A1	O	0.10 VDC @ 20 µA	4.50 VDC @ 20 µA

PA1 Connector Pin Functions and Voltages

Pin #	Description	I/O	Max Lo	Min Hi
1	5 VDC	O	4.75 VDC	
2	GND	O	0 VDC	0 VDC
3	Pulser Data A1	I	1.00 VDC	3.50 VDC
4	Pulser Data A1	I	1.00 VDC	3.50 VDC

PB1 Connector Pin Functions and Voltages

Pin #	Description	I/O	Max Lo	Min Hi
1	5 VDC	O	4.75 VDC	
2	GND	O	0 VDC	0 VDC
3	Pulser Data B1	I	1.00 VDC	3.50 VDC
4	Pulser Data B1	I	1.00 VDC	3.50 VDC

PA2 Connector Pin Functions and Voltages

Pin #	Description	I/O	Max Lo	Min Hi
1	5 VDC	O	4.75 VDC	
2	GND	O	0 VDC	0 VDC
3	Pulser Data A2	I	1.00 VDC	3.50 VDC
4	Pulser Data A2	I	1.00 VDC	3.50 VDC

PB2 Connector Pin Functions and Voltages

Pin #	Description	I/O	Max Lo	Min Hi
1	5 VDC	O	4.75 VDC	
2	GND	O	0 VDC	0 VDC
3	Pulser Data B2	I	1.00 VDC	3.50 VDC
4	Pulser Data B2	I	1.00 VDC	3.50 VDC

PA3 Connector Pin Functions and Voltages

Pin #	Description	I/O	Max Lo	Min Hi
1	5 VDC	O	4.75 VDC	
2	GND	O	0 VDC	0 VDC
3	Pulser Data A3	I	1.00 VDC	3.50 VDC
4	Pulser Data A3	I	1.00 VDC	3.50 VDC

PB3 Connector Pin Functions and Voltages

Pin #	Description	I/O	Max Lo	Min Hi
1	5 VDC	O	4.75 VDC	
2	GND	O	0 VDC	0 VDC
3	Pulser Data B3	I	1.00 VDC	3.50 VDC
4	Pulser Data B3	I	1.00 VDC	3.50 VDC

P309A Connector Pin Functions and Voltages

Pin #	Description	I/O	Max Lo	Min Hi
1	Slowdown Valve A1	O	0 VAC	115 VAC
2	Main Valve A1	O	0 VAC	115 VAC
3	Slowdown Valve B1	O	0 VAC	115 VAC
4	Main Valve B1	O	0 VAC	115 VAC
6	AC Neutral	O	0 VAC	
7	AC Neutral	O	0 VAC	
8	AC Neutral	O	0 VAC	
9	AC Neutral	O	0 VAC	

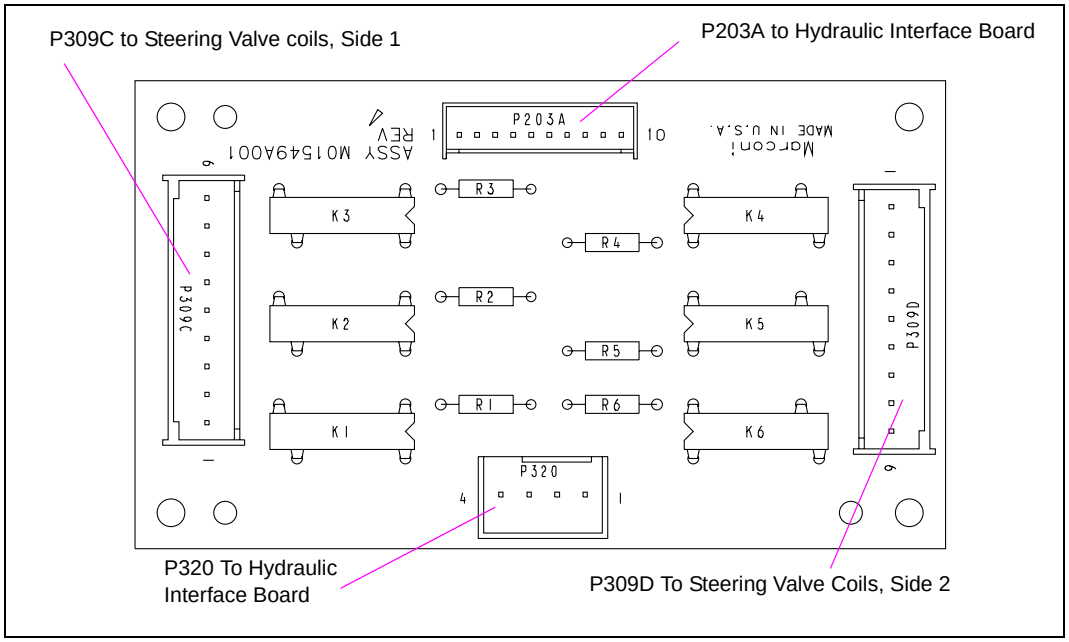
P309B Connector Pin Functions and Voltages

Pin #	Description	I/O	Max Lo	Min Hi
1	Slowdown Valve A2	O	0 VAC	115 VAC
2	Main Valve A2	O	0 VAC	115 VAC
3	Slowdown Valve B2	O	0 VAC	115 VAC
4	Main Valve B2	O	0 VAC	115 VAC
6	AC Neutral	O	0 VAC	
7	AC Neutral	O	0 VAC	
8	AC Neutral	O	0 VAC	
9	AC Neutral	O	0 VAC	

M01549A001 Steering Valve Relay PCA

This board is used only with 6-hose blenders on the Encore 300. It accepts 0 to 14 VDC levels that control solid state relays. These relays turn the steering valves on and off. Units manufactured after June 2002 will use M02097A001. M01549 and M02097 are electronically the same but are not interchangeable because of connector differences.

Figure 6-15: Steering Valve Relay Board - M01549A001



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P203A (10 pin)	M01694A001	M01546A001 Hydraulic Interface PCA	P206 (10 pin)
P309C (9 pin)	M01685A001	Fixed Blender Manifold M00223B002 - Side 1 coils	J701 (9 pin)
P309D (9 pin)		Fixed Blender Manifold M00223A001 - Side 2 coils	
P320 (4 pin)	R20593-G1	M01546A001 Hydraulic Interface PCA	

Test Points

Test Point	Range	Current (Max)
P203A-7 P203A-8	14 VDC,+/- 0.50 VDC	70 mA
P320-1 with respect to P320-2	115 VAC, +/- 5%	600 mA

P203A Input Requirements

Pin #	Signal Name	On	Off
1	SVA1		
2	SVA2		
3	SVA3		
4	SVB1	10 mA of current flow	0.5 mA or less of current flow
5	SVB2		
6	SVB3		
7, 8	+14 V		
9,10	GND		

P309C Output Requirements

Pin #	Signal Name	On	Off
1	Steering Valve A1	Current flow [1]	No current flow [2]
2			
3	Neutral		
4	Steering Valve A2	Current flow [1]	No current flow [2]
5			
6	Neutral		
7	Steering Valve A3	Current flow [1]	No current flow [2]
8			
9	Neutral		

Notes:

1. Requires a 300 mA load to the appropriate neutral connection. There should be current flow through the load and no more than a 1.4 Volt (peak) drop between P320-1 and the appropriate output.

2. There should be 100 μA or less of current flow through the load.

P309D Output Requirements

Pin #	Signal Name	On	Off
1	Steering Valve B1	Current flow [1]	No current flow [2]
2			
3	Neutral		
4	Steering Valve B2	Current flow [1]	No current flow [2]
5			
6	Neutral		
7	Steering Valve B3	Current flow [1]	No current flow [2]
8			
9	Neutral		

Notes:

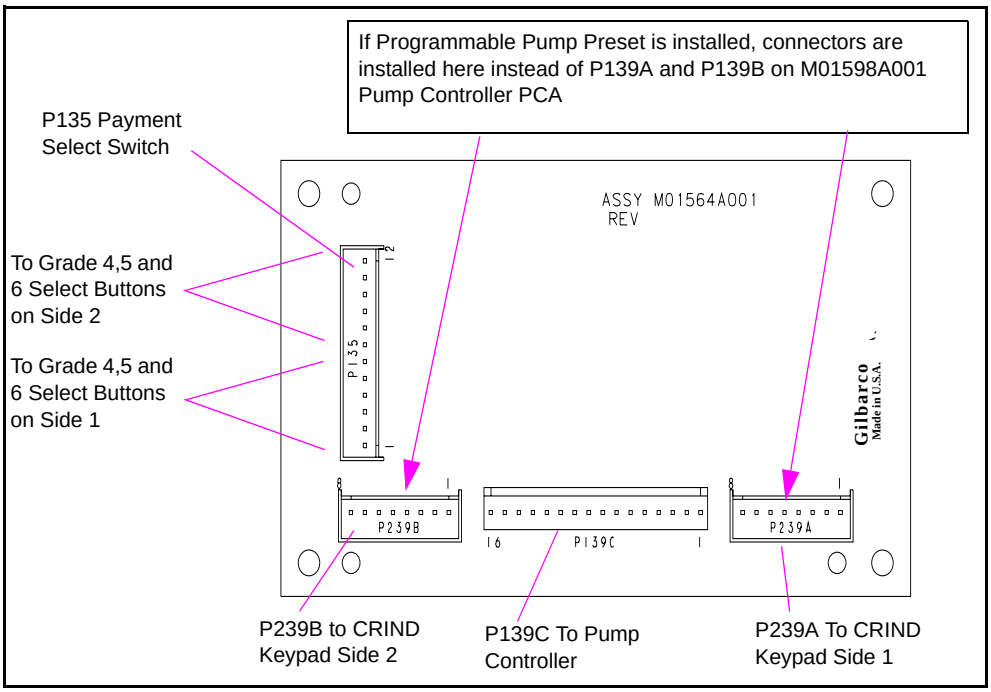
1. Requires a 300 mA load to the appropriate neutral connection. There should be current flow through the load and no more than a 1.4 Volt (peak) drop between P320-1 and the appropriate output.

2. There should be 100 μA or less of current flow through the load.

M01564A001 Grade Select PCA

Grade Select printed circuit board is used on the Encore 300 for grade select and pump preset option for units with 4, 5 or 6 grade select options.

Figure 6-16: Grade Select Board - M01564A001


If Programmable Pump Preset is installed, connectors are installed here instead of P139A and P139B on M01598A001 Pump Controller PCA
P135 Payment Select Switch
To Grade 4,5 and 6 Select Buttons on Side 2
To Grade 4,5 and 6 Select Buttons on Side 1
ASSY M01564A001
REV
P135
P239B
P139C
P239A
Gilbarco
Made in U.S.A.
P239B to CRIND Keypad Side 2
P139C To Pump Controller
P239A To CRIND Keypad Side 1

Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P135 (12 pin)	M01695A001	Payment Select Membrane Switches T19370	P136 (4 pin)
P139C (16 pin)	M01693A001	Pump Controller PCA	P139A/B (8 pin)
P239A (8 pin) P239B (8 pin)	M01686A001	CRIND Keypad M00141B002	P902 Side 1 or 2 (12 pin)

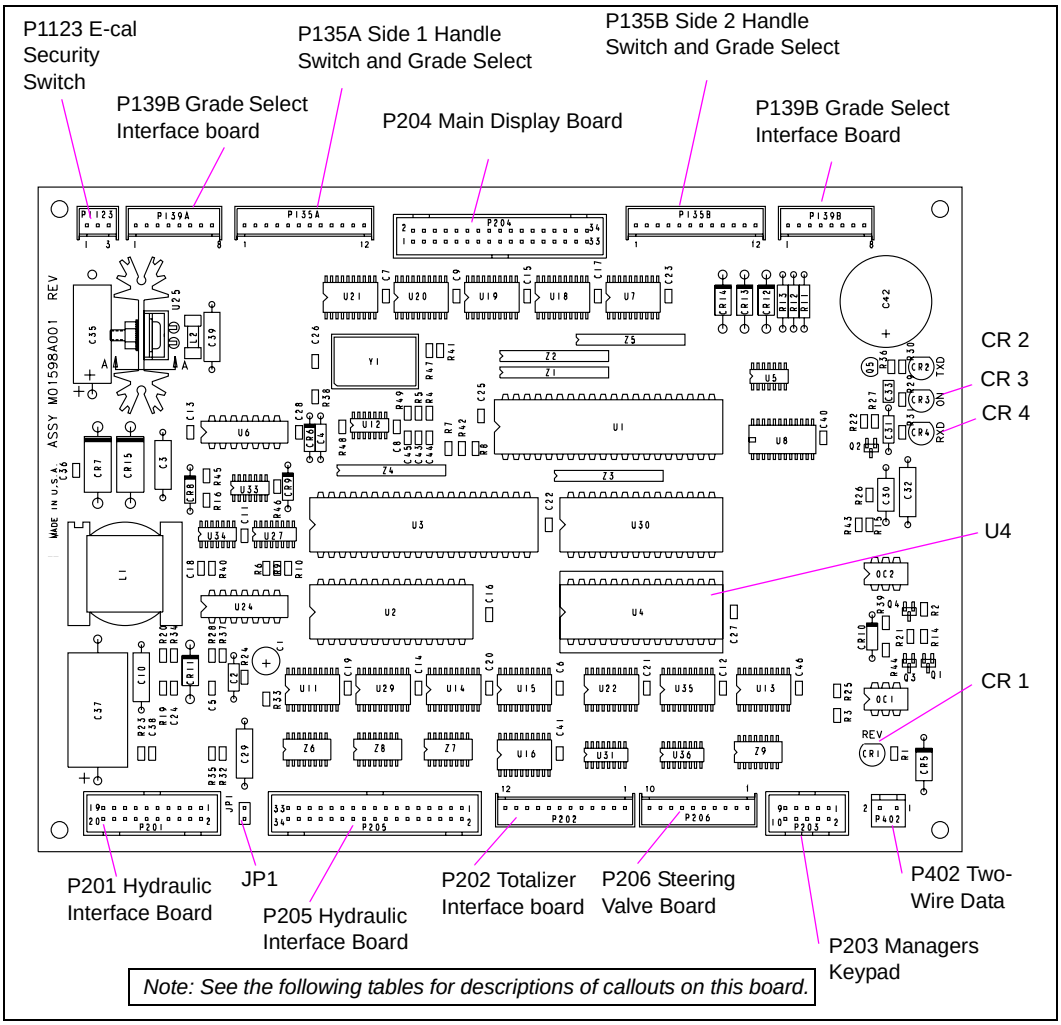
M01598A001 Pump Controller PCA

Pump Controller Board on the Encore 300 processes data pulses from pulser assemblies, level changes from pump handles, and two-wire serial data. Also provides necessary outputs to control the transaction and price posting displays, solenoid valves, STPs, motors and converts 14 VDC to 5 VDC. The function of this board is similar to the Advantage T20011-G1 Pump Controller Board; however, the firmware on this board is not compatible with the Encore 300.

IMPORTANT INFORMATION

This board runs at approximately 50% faster clock speed than an Optimized Advantage Pump Controller Board.

Figure 6-17: Pump Controller Board - M01598A001


P1123 E-cal Security Switch
P139B Grade Select Interface board
P135A Side 1 Handle Switch and Grade Select
P204 Main Display Board
P135B Side 2 Handle Switch and Grade Select
P139B Grade Select Interface Board
CR 2
CR 3
CR 4
U4
CR 1
P201 Hydraulic Interface Board
JP1
P205 Hydraulic Interface Board
P202 Totalizer Interface board
P206 Steering Valve Board
P402 Two-Wire Data
P203 Managers Keypad
Note: See the following tables for descriptions of callouts on this board.

LED Indicators

LED	Indicates
CR-1	On = two-wire loop reversed
CR-2	Blinking = transmitting data
CR-3	On = CPU is on
CR-4	Blinking = receiving data from console

Memory

IC	Description
U4	Firmware location

Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P135A/B (12 pin)	M01650A001 (harness)	T17764-G3/4 CRIND Z180 Logic Board	P264 (6 pin)
		M01621A001 Totalizer Interface PCA	P1507 (12 pin)
		M01522A001 Single PPU Board	P2201 (2 pin)
		M01525A001 Dual PPU PCA	P2201 (2 pin)
P201 (20 pin)	R17995-G7	M01546A001 Hydraulic Interface PCA	P101 (20 pin)
P202 (12 pin)	M01650A001 (harness: see above)		
P203 (10 pin)			
P204 (34 pin)			
P206 (10 pin)	Not used		
P402 (2 PIN)	M01664A001	2 Wire from Field Wiring	
P1123 (3 PIN)	M00150A001 E-cal Security Switch		

P201 Connector Pin Functions and Voltages

Pin#	Description	I/O	Max Low	Max High
1	SYS RESET	O	0.10 VDC	4.50 VDC
2	VVac Error	I	0.80 VDC	2.00 VDC
3	TXB	O	0.40 VDC	4.75 VDC
4	RXDB	I	0.80 VDC	2.00 VDC
5	14.5 V	I	See “P201 Power Test Points” on 6-42	
6	14.5 V	I		
7	14.5 V	I		
8	DC GND	I		
9	DC GND	I		
10	DC GND	I		
11	DC GND	I		
12	DC GND	I		
13	DC GND	I		
14	DC GND	I		
15	+5 VDC	O	See “P201 Power Test Points” on 6-42	
16	+5 VDC	O		
17	DC GND	I		

18	DC GND	I	
19	+5 VDC	O	See “P201 Power Test Points” on 6-42
20	+5 VDC	O	

P202 Connector Pin Functions and Voltages

Pin#	Description	I/O	Max Low	Max High
1	Connect A	I	0 V	4.50 VDC @ 20 μA
2	STP-1	O	1.30 VDC @ 156 mA	
3	STP-2	O	1.30 VDC @ 156 mA	
4	STP-3	O	1.30 VDC @ 156 mA	
5	14.5 V	O	See “P201 Power Test Points” on page 6-42	
6	GND	O		
7	Connect B	I	0 V	4.50 VDC @ 20 μA
8	SPARE A	O	1.30 VDC @ 156 mA	
9	SPARE B	O	1.30 VDC @ 156 mA	
10	SPARE C	O	1.30 VDC @ 156 mA	
11	14.5 V	O	See “P201 Power Test Points” on page 6-42	
12	GND	O	0 V	0 V

Jump Jack Settings

Jump Jack	Position	Function
JP1	IN	Push to start activated
	OUT	Lever on activated

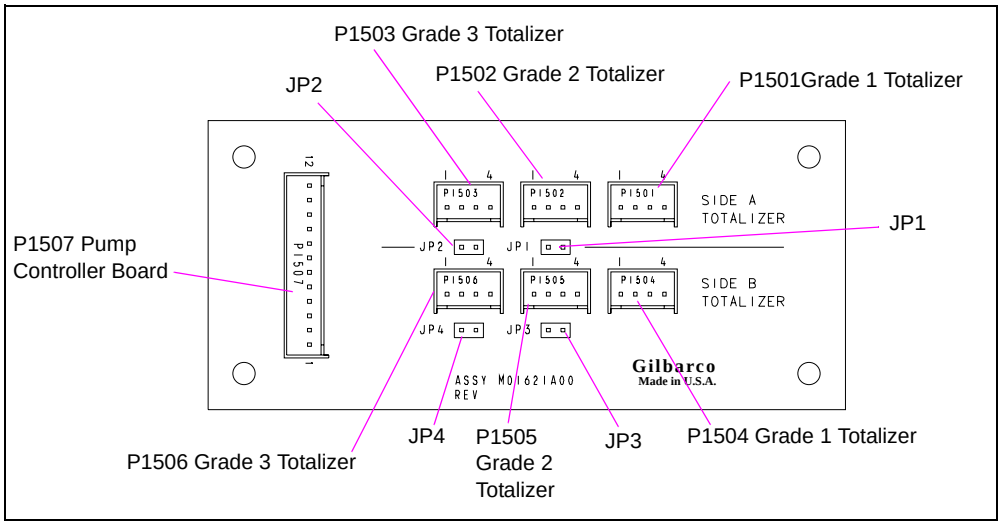
P201 Power Test Points

Connector Pin#	I/O	Signal Name	Tolerance	Maximum Current
P201-6	I	14.5 VDC	14.5 VDC +/- 5%	800 mA
P201-12	I	GND/Signal Return	0 VDC	
P201-16	O	5 VDC	5 VDC +/- 5%	125 mA

M01621A001 Totalizer Interface PCA

This board is the interface for the electromechanical totalizers.

Figure 6-18: Totalizer Interface Board - M01621A001



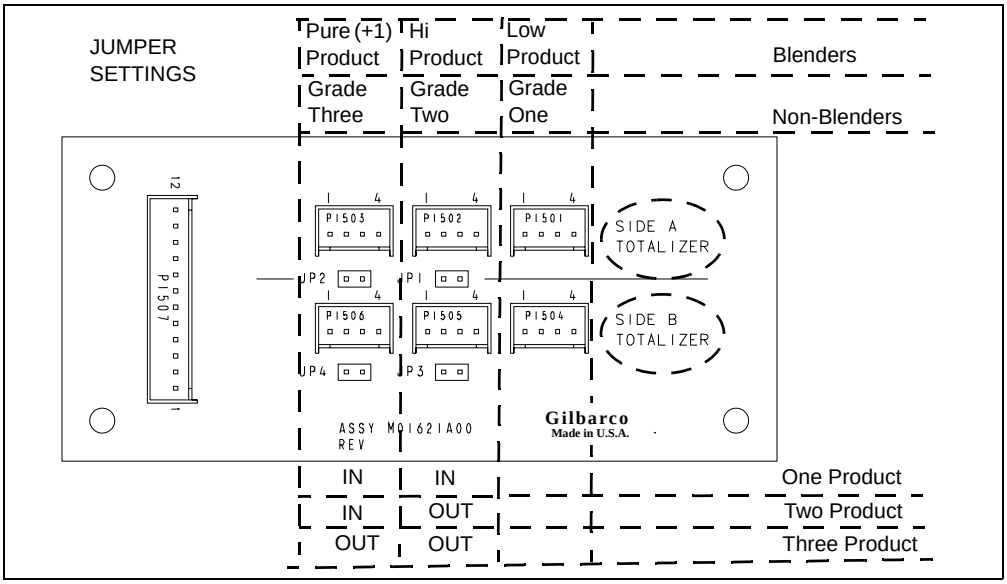
Board Connections and Cables

Connector#	Via Cable	To Board
P1501 (4 pin)	Totalizer cable	Electronic Totalizer Side 1 Grade 1
P1502 (4 pin)		Electronic Totalizer Side 1 Grade 2
P1503 (4 pin)		Electronic Totalizer Side 1 Grade 3
P1504 (4 pin)		Electronic Totalizer Side 2 Grade 1
P1505 (4 pin)		Electronic Totalizer Side 2 Grade 2
P1506 (4 pin)		Electronic Totalizer Side 2 Grade 3
P1507 (12 pin)	M01650A001 (harness)	See “M01621A001 Totalizer Interface PCA” on page 6-43

Jump Jack Settings

Jump Jack	Position	Function
J1	Side A	One Grade or Single Product
J2	Side A	One or Two Grades or Two Product
J3	Side B	One Grade or Single Product
J4	Side B	One or Two Grades or Two Product

Figure 6-19: Jumper Setting Diagram for M01621A001



M01753A001 CRIND Control Node-2

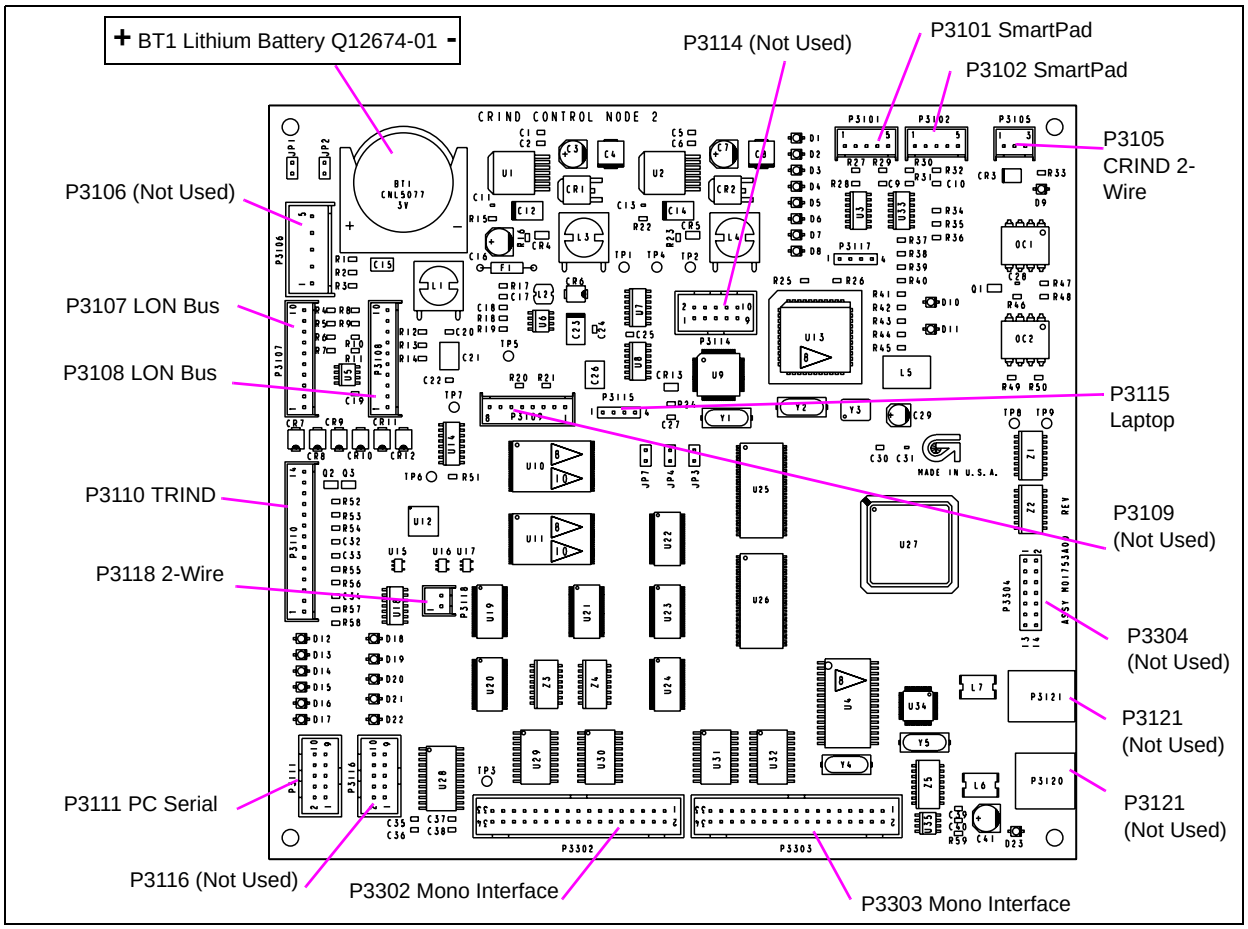
The CRIND Control Node (CCN) is the primary CRIND device option processor on eCRIND-equipped Encore 500 and Eclipse units. This node receives information directly or indirectly from, and/or controls the card reader, monochrome display, printer, barcode scanner, cash acceptor, beeper, and CRIND related keypads. It also interfaces with TRIND devices and supports USB communications.

The M01753A001 CCN is backward compatible with M00089A00X CCN. It requires CNN BIOS version 2.1.80 or higher. The M00089A00X is forward compatible with the M01753A001 CCN with the exception of enhanced durability improvements.

Service Tips

- Coldstarts are best done using the diagnostic card and the “Clear Persistent Memory” function.
- If the M01763A001 CCN is replaced with a M00089A00X CCN, then a M00092A001 Monochrome Interface PCA and a M00545A001 interface cable will be required.

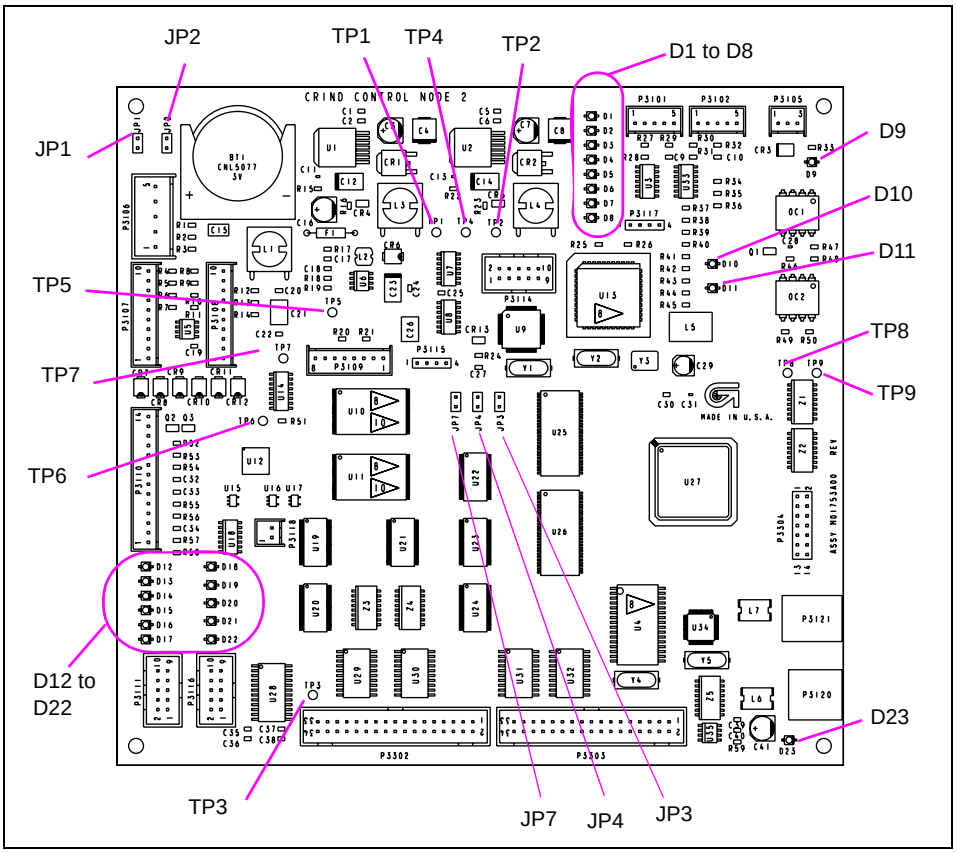
Figure 6-20: CRIND Control Node-2 Connectors - M01753A001



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P3101 (5 pin)	M00497	SmartPad T20247-01	
P3102 (5 pin)			
P3105 (3 pin)	M02159A002	CRIND 2 wire	P412
P3107 (10 pin)		LON Bus	
P3108 (10 pin)			
P3110 (14 pin)		TRIND	
P3111 (10 pin)	M00719A001	Serial programming port	
P3115 (4 pin)	M02995A001	to Laptop	
P3117 (4 pin)			
P3118 (2 pin)		Pump Control Node	P1109 (2 pin)
P3302 (34 pin)	M00553A001	Mono module	J1 (34 pin)
P3203 (34 pin)			

Figure 6-21: CRIND Control Node-2 LEDs, Jump Jacks and Test Points



Status LEDs

LED	Name	Status Indication
D1	HEART BEAT	Flashes steadily at rate of “on” for 1 second, “off” for 1 second during normal operation. Flashing begins 15-20 seconds after power up.
D2	SMARTPAD A TX	Blinking when sending data to Side 1 SmartPad or Krone pinpad via P3101.
D3	SMARTPAD A RX	Blinking when receiving data from Side 1 SmartPad or Krone pinpad via P3101.
D4	SMARTPAD B TX	Blinking when sending data to Side 2 SmartPad or Krone pinpad via P3102.
D5	SMARTPAD B RX	Blinking when receiving data from Side 1 SmartPad or Krone pinpad via P3102.
D6	LON TERM1	• Off solid is normal condition • On solid when LON cable connected to P3107 is not terminated
D7	LON TERM2	• Off solid is normal condition • On solid when LON cable connected to P3108 is not terminated
D8	NEURON STAT	• Off solid is normal condition • On solid if Neuron is applicationless (node must be returned) • Blinking at a rate of “on” for 1 second, “off” for 1 second if Neuron in not configured (node must be returned) • Short flashes every 1.5 seconds indicates PCN software is not running. This is normal during PCN software upgrade, and during the first 15-20 seconds of startup.
D9	POS 2W REV	• Off solid is normal condition • ON solid if 2-wire loop is reversed
D10	POS TX	Blinking when sending data to the POS via P3105
D11	POS RX	• Off when current is present but communications are idle • On solid if no current is present • Blinking when receiving data from POS via P3110
D12	TRIND TX	Blinking when sending data to TRIND system via P3110
D13	TRIND RX	Blinking when receiving data from TRIND system via P3110
D14	PC SER TX	Blinking when sending data to service laptop via P3111
D15	PC SER RX	Blinking when receiving data from service laptop via P3111
D16	PCN 2W TX	Blinking when sending data to the pump via P3118
D17	PCN 2W RX	• Off when current is present, but communications are idle • On solid if no current present • Blinking when receiving data from pump via P3118
D18	STATE A	Currently not used
D19	STATE B	Currently not used
D20	STATE C	Currently not used
D21	STATE D	Currently not used
D22	STATE E	• Off solid is normal condition • On solid if CRIND MIP version is older than V02.0.00, of if Neuron is not communicating with the CPU. Usually means MIP must be upgraded, but sometime infers board failure.
D23	USB GOOD	On solid if USB link is established

Test Points

Test Point	Value	Where Used
TP1	3.15 to 3.45 VDC	Memory voltage
TP2	4.75 to 5.25 VDC	Logic voltage
TP3	35 VDC	Display voltage
TP4	Common	for DC voltage
TP5	14 to 28 VDC	LON voltage
TP6	2 to 3.6 VDC	RAM voltage
TP7	2 to 3.6 VDC	Battery voltage

Jump Jacks

Jumper	Setting	Function
JP1	Out	Reset (see Note 1)
JP2	Out	Coldstart
JP3	Out	Service (see Note 2)
JP4	Out	LON Programming (see Note 1)
JP7	Out	Battery disconnect

Notes:
1. Used in manufacturing
2. Used in board repair

M01785A001 Door Node-2

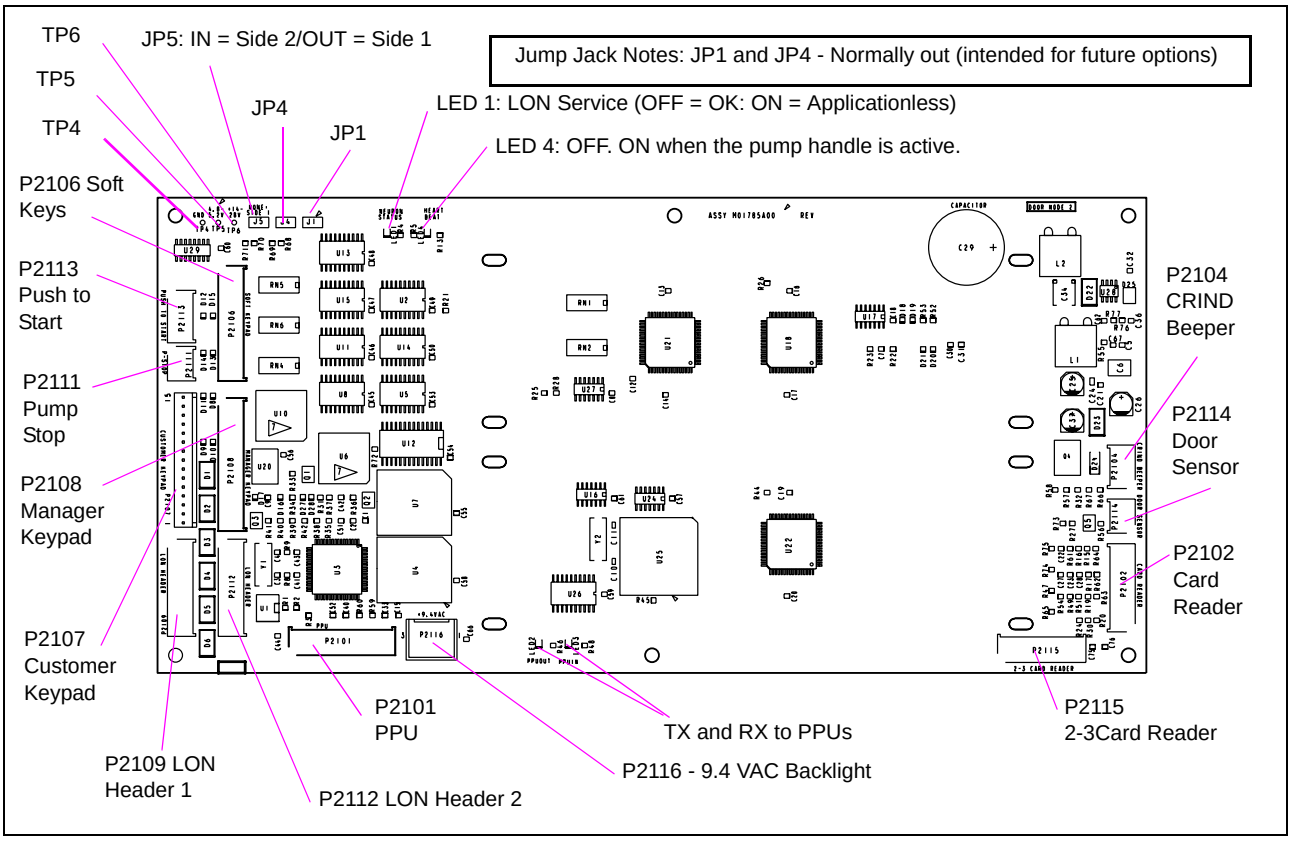
Door Node-2 is used on Encore 500 and Eclipse series units. This node displays transaction information to the customer and serves as on I/O gathering point by interfacing peripherals to the LON bus. These peripherals include the card reader, customer keypad, and CRIND beeper. The door node collects pump handle and grade data, maintains a backup of the pumps data, and communicates to the PPU display boards for that side.

The M01785 Door Node-2 is backward compatible with M00062A00X Door Node requires door node LON version 1.0.37 or higher. The M00062A00X door node is forward compatible with M01785A001, with the exception that certain enhanced reliability components will not be available.

Service Tip

Do not disrupt the download process when loading door node MIP software or the node will require repair at the factory.

Figure 6-22: Door Node-2 for Encore 500 and Eclipse


TP6
TP5
TP4
JP5: IN = Side 2/OUT = Side 1
JP4
JP1
Jump Jack Notes: JP1 and JP4 - Normally out (intended for future options)
LED 1: LON Service (OFF = OK: ON = Applicationless)
LED 4: OFF. ON when the pump handle is active.
P2106 Soft Keys
P2113 Push to Start
P2111 Pump Stop
P2108 Manager Keypad
P2107 Customer Keypad
P2109 LON Header 1
P2112 LON Header 2
P2101 PPU
TX and RX to PPUs
P2116 - 9.4 VAC Backlight
P2115 2-3Card Reader
P2104 CRIND Beeper
P2114 Door Sensor
P2102 Card Reader

Status LEDs

LED	Status Indication
1	LON (Neuron) Status - ON or blinking indicates LON problem
2	TX or PPU-OUT indicates communication to PPU boards
3	RX or PPU-IN indicates communication from PPU boards
4	OFF. ON when the pump handle is active.

Test Points

Test Point	Range
TP4	GRND
TP5	4.75 V to 5.25 VDC
TP6	+14 V to +23 VDC

Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P2101 (11 pin)	• M00509A001 or M00509A002 for Encore • M00509A003 for Eclipse	M00077A001 Totalizer Node, one per grade	P2201
P2102 (9 pin)	• M00501A001 (Encore) • M00501A002 (Eclipse)	• Card Reader (7 pin) • Card Reader Heater R20379 (2 pin)	
P2104 (4 pin)	• M00636A001 (Encore) • M00495A001/ M00636A002 (Eclipse)	Speaker (refer to the Encore Series Cable Block Diagram or the Eclipse Series Cable Block Diagram).	
P2106 (12 pin)	M01200A001	Soft Keys Keypad (see Encore Cable Block Diagram M00284)	
P2107 (15 pin)	M01202A001 (Encore M01202A002 (Eclipse)	Customer Keypad Options (CRIND or PPP): • M01109 Misc Options Keypad • M00141 CRIND Keypad	Refer to the Encore Series Cable Block Diagram or the Eclipse Series Cable Block Diagram.
P2108 (14 pin)	M00515A001 (Encore) M00515A003 (Eclipse)	M00147 Manager Keypad (Side 1 only)	
P2109 (10 pin)	M00489	LON Bus 1	
P2110 (4 pin) [Call Button] P2111 (3 pin) [Push to Stop] P2113 (5 pin) [Push to Start]	M01201A001 (Encore) M01215A001 (Encore)	M01109B001 Miscellaneous Options Keypad	12 pin
P2112 (10 pin)	M00489	LON Bus 2	
P2114 (4 pin)	N/A	Door sense	
P2115 (9 pin)	M00614A004 (Encore) M00614A002 (Eclipse)	Power Supply 9.4 VAC (PS2 to PS3 on bulkhead connector)	PS2
P2116 (3 pin)	M00614A005 to M00614A004	Main Power Supply	J2115

Connector Pin Functions and Voltages

P2101

Pin #	Description	Input/Output Voltage
1	+9.4 VAC	9.4 VAC +/-10%
2	+9.4 VACRTN	
3	GND	0 VDC
4	GND	0 VDC
5	DLT+5 VDC	+4.7 V +/-10%
6	PPUCLK	0 to 5 V
7	PPUFBDATA	0 to 5 V
8	PPUSND_REC	0 to 5 V
9	PPUBP	0 to 5 V
10	PPUSDATA	0 to 5 V
11	PPUSYNC	0 to 5 V

P2102

Pin #	Description	Input/Output Voltage
1	VCC	+5 V +/-5%
2	CRRDT1	0 to 5 V
3	CRRCL1	0 to 5 V
4	CRRDT2	0 to 5 V
5	CRRCL2	0 to 5 V
6	CRCLD	0 to 5 V
7	GND	0 V
8	CRSTAT	Open to 0 V
9	GND	0 V

P2103

Pin #	Description	Input/Output Voltage
1	VCC	+5 V +/-5%
2	GND	0 V
3	PRSENIN	0 to 5 V
4	PRSENSTAT	Open to 0 V
5	+18 VUNREG	+14V to +23V

P2104

Pin #	Description	Input/Output Voltage
1	VCC	+5 V +/-5%
2	SPKRTN	Open Collector to 0 V
3	SPKR_STAT	Open to 0 V
4	GND	0 V

P2109

Pin #	Description	Input/Output Voltage
1	+18 VUNREG	+14 V to +23 V
2	GND	0 V
3	+18 VUNREG	+14 V to +23 V
4	GND	0 V
5	485B	-7 V to +12 V Max.
6	485A	-7 V to +12 V Max.
7	GND	0 V
8	+18 VUNREG	+14 V to +23 V
9	EXTRESET	0 V to +12 V
10	TERM RES FEEDTHRU	

P2112

Pin #	Description	Input/Output Voltage
1	+18 VUNREG	+14 V to +23 V
2	GND	0 V
3	+18 VUNREG	+14 V to +23 V
4	GND	0 V
5	485B	-7 V to +12 V Max.
6	485A	-7 V to +12 V Max.
7	GND	0 V
8	+18 VUNREG	+14 V to +23 V
9	EXTRESET	0 V to +12 V
10	TERM RES FEEDTHRU	

P2115

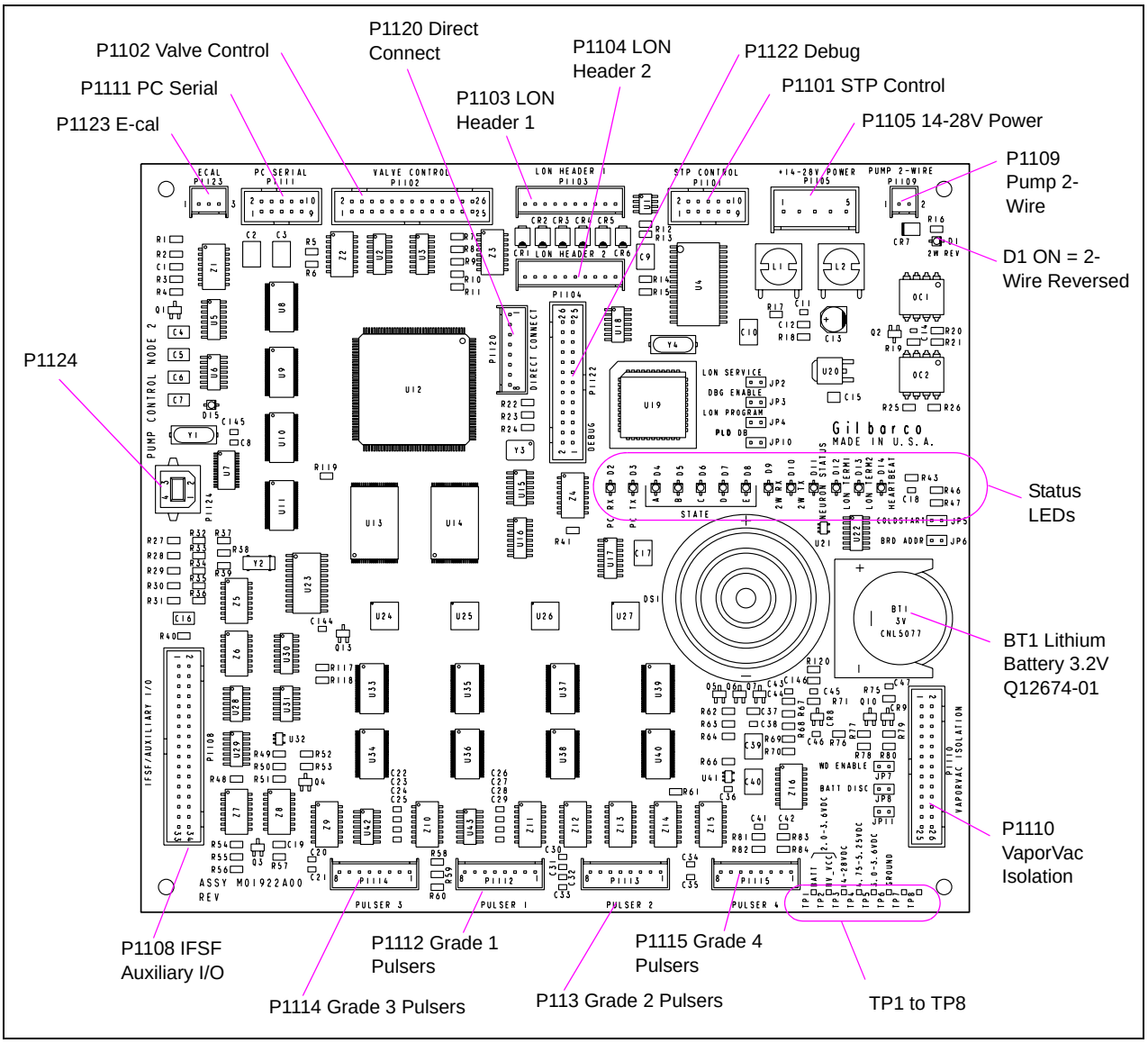
Pin #	Description	Input/Output Voltage
1	+9.4 VAC	9.4 VAC +/-10%
2	+9.4 VACRTN	
3	No connect	

M01922A001 Pump Control Node-2

The Pump Control Node (PCN) is used on the Encore 500 and Eclipse series units to control fueling operations. It performs all totals calculations, processes handle switch information and pulser input, and stores Weights and Measures data. The PCN interfaces directly with the VaporVac-Controller, STP Control Board, and Valve Driver Board. The PCN interfaces with the Door Node, CRIND Control Node (CCN) and the Automatic Temperature Compensation (ATC) Node via the LON. It uses the ATC Node to supply information to adjust the metered volume to a predetermined standard temperature.

The M01922A001 PCN is backward compatible with M0056A00X PCN. It requires PCN software version 1.6.00 or higher. The M0056A00X node is forward compatible with M01922A001, but certain enhancements such as USB support and durability improvements will be lost. For non-eCRIND units, the Pump Control Node provides the main processing power for system. The lithium battery on this board maintains level 1 and level 2 programming.

Figure 6-23: Pump Control Node-2 PCA



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P112-P115 (Qty 4; 8 pin)	• M00453A001 (Encore) • M01026A001 (Eclipse)	Quad Pulser(s) M00786B001	
P1101 (10 pin)	M00635A001	STP Board m00047	P1301
P1102 (26 pin)	M00549A001	M00059A00X Steering Valve Driver PCA	P1201
P1103	M00489A001 (LON Header 1: 10 pin)	LON system, Side 1	
P1104	M00489A001 (LON Header 2: 10 pin)	LON system, Side 2	
P1105 (5 pin)	M00635A001	M00050A001 Power Supply Board 18 VDC	P1402
P1106 (Ethernet 1/34 pin)	M00712A001	M00071A001 Pump Ethernet Board (not yet available)	(34)
P1108 (34 pin)	M00713A001	IFSF Interface Board	J2 (34)
P1109 (2 wire)	M00491A001	Pump 2-Wire: • to Terminal Block in Power Supply or • M00089A001 CRIND Control Node or • MOC special CRIND Control Node M00089G001 (See M00089A001 CRIND Control Node)	
P1110 (26 pin)	M00549A002 (Encore) M01036A001 (Eclipse)	M00080 VaporVac Isolation PCB	P1405
P1111 (10 pin)	M00719A001	Serial Programming Port	
P1123 (3 pin)	M00150A001 (Encore) M00150A002 (Eclipse)	ECal Security Switch	(3)
P1124 (Ethernet 2/16 pin)			

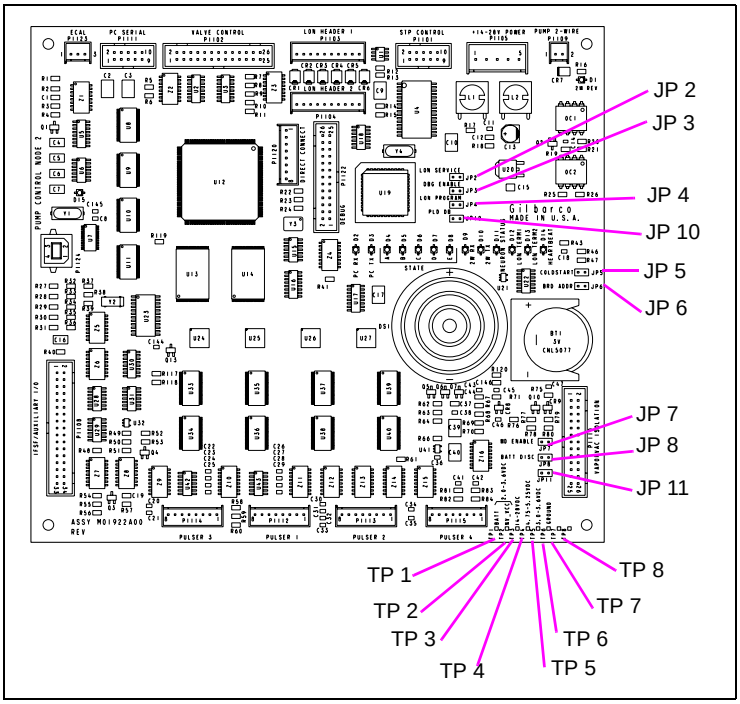
Status LEDs

LED	Name	Status Indication
D1	2W REV	On solid if 2-wire loop is reversed
D2	PC RX	Blinking when receiving data from PC
D3	PC TX	Blinking when Transmitting data to PC
D4	STATE A	On solid when application is running properly
D5	STATE B	On solid when application is running properly
D6	STATE C	Blinking if PCN is unable to communicate with door nodes
D7	STATE D	On solid when handle on Side 1 is raised
D8	STATE E	On solid when handle on Side 2 is raised
D9	2W RX	Blinking when receiving data from POS or CRIND
D10	NEU 2W TX	• Off when current is present • On solid if no current is present • Blinking when transmitting to POS or CRIND

LED	Name	**Status Indication**
D11	NEU STAT	• Off solid is normal condition • On solid if Neuron is applicationless (node must be returned) • Blinking at a rate of “on” for 1 second, “off” for 1 second if Neuron in not configured (node must be returned) • Short flashes every 1.5 seconds indicates PCN software is not running. This is normal during PCN software upgrade, and during the first 15-20 seconds of startup.
D12	LON TERM1	• Off solid is normal condition • On solid when LON cable connected to P1103 is not terminated
D13	LON TERM2	• Off solid is normal condition • On solid when LON cable connected to P1104 is not terminated
D14	HEART BEAT	Flashes steadily at rate of “on” one half second, “off” one half second during normal operation. Flashing begins 15-20 seconds after power up.

Test Points and Jump Jacks

Figure 6-24: Test Points and Jump Jack Locations



Test Points

Test Point	Value	Where Used
TP1	2 to 3.6 VDC	Battery Voltage
TP2	2 to 3.6 VDC	Memory Voltage
TP3	14 to 28 VDC	Lon Voltage
TP4	4.75 to 5.25 VDC	Logic Voltage
TP5	3 to 3.6 VDC	Logic Voltage
TP6	common	For DC Voltage

Jump Jacks

Jumper	Setting	Function
JP2	Out	LON service (see Note 2)
JP3	Out	Debug enabled (see Note 2)
JP4	Out	LON programming (see Note 1)
JP5	Out	Coldstart
JP6	In	Board address
JP7	In	Watchdog enabled
JP8	Out	Battery disconnect
JP10	Out	N/A
JP11	Out	N/A

Notes:
1. Used in manufacturing
2. Used in board repair

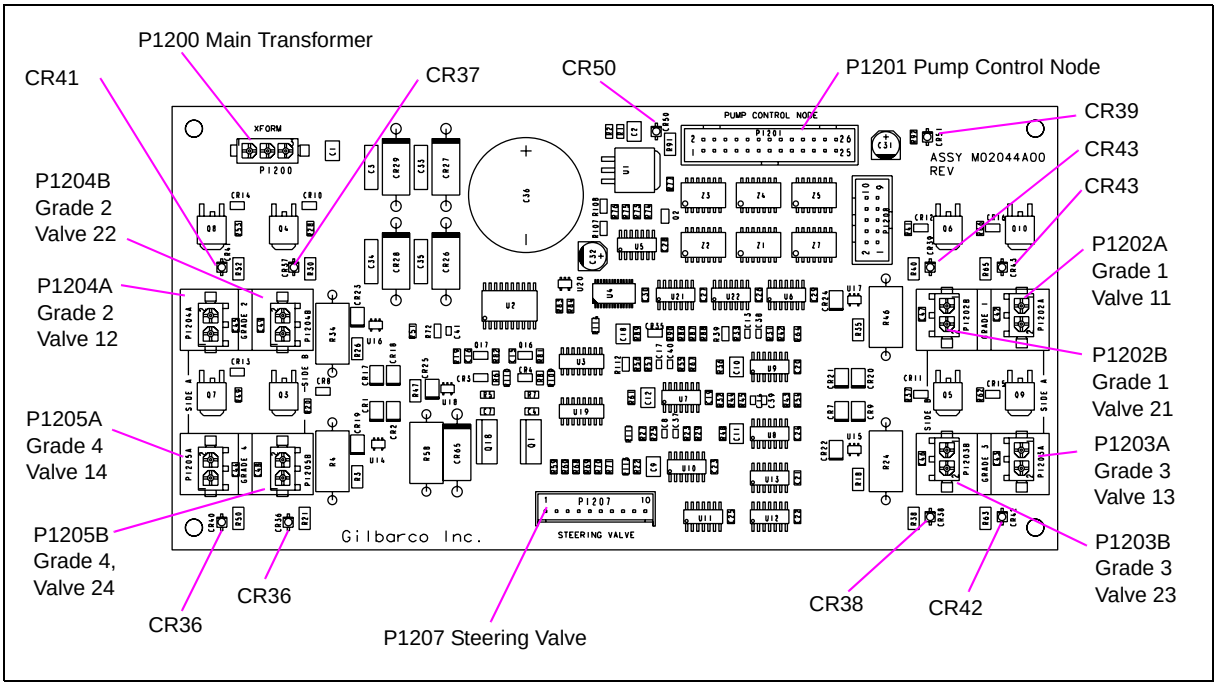
M02044A001 Valve Converter PCA

This board is in Encore 500 and the Eclipse series units with Proportional Flow Control Valves (PFCV). This board is the equivalent to the Encore 500 and Eclipse units with the digital valve driver board.

Service Tip

Voltage to coils typically varies from 10 to 18 VDC during operation depending upon operating conditions. Coil resistance is 40 to 45 ohms.

Figure 6-25: Valve Converter PCA M02044A001



Board Connections and Cables

Connector	Description	Via Cable	To Board	At Connector#
P1200	Main Transformer			
P1201 (26 pin)	Pump Control Node	M04549A001	Valve Controller	P1102
P1202A	Grade 1	M02958A001	Valve 11	cable is part of valve assembly
P1202B			Valve 21	
P1203A	Grade 3		Valve 13	
P1203B			Valve 23	
P1204A	Grade 2		Valve 12	
P1204B			Valve 22	
P1205A	Grade 4		Valve 14	
P1205B			Valve 24	
P1207 (10 pin)	Steering Valve	M01694A001	M02097A001	P203A (10 pin)

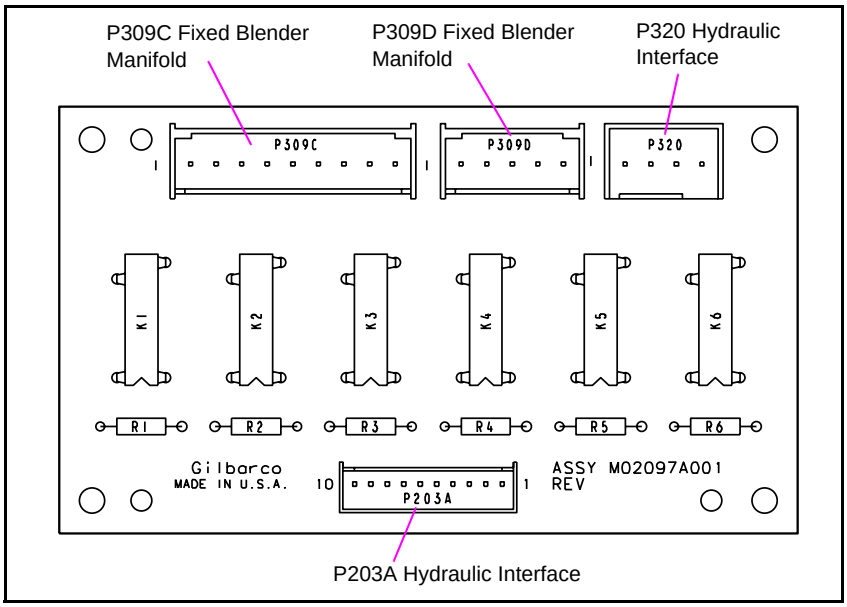
Status LEDs

LED	Status Indication
CR36 to CR43	On indicates current flow to the corresponding valve
CR50	On indicates +24 VDC valve voltage is present
CR51	On indicates +5 VDC is present

M02097A001 Steering Valve Relay PCA

This board is on Encore 300 series units and used only with 6-hose blenders. It accepts 0 to 14 VDC levels that control solid state relays. These relays turn the steering valves on and off. M01549 and M02097 are not interchangeable.

Figure 6-26: Steering Valve Relay Board M02097A001



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P203A (10 pin)	M01694A002	M02335A001 Hydraulic Interface	P306
P309C (9 pin) P309D (5 pin)	M01339A002	M01339A002 Fixed Blender Manifold, sides A and B	P701A/P701B
P320 (4 pin)	R20593-G1	M02335A001 Hydraulic Interface	P310

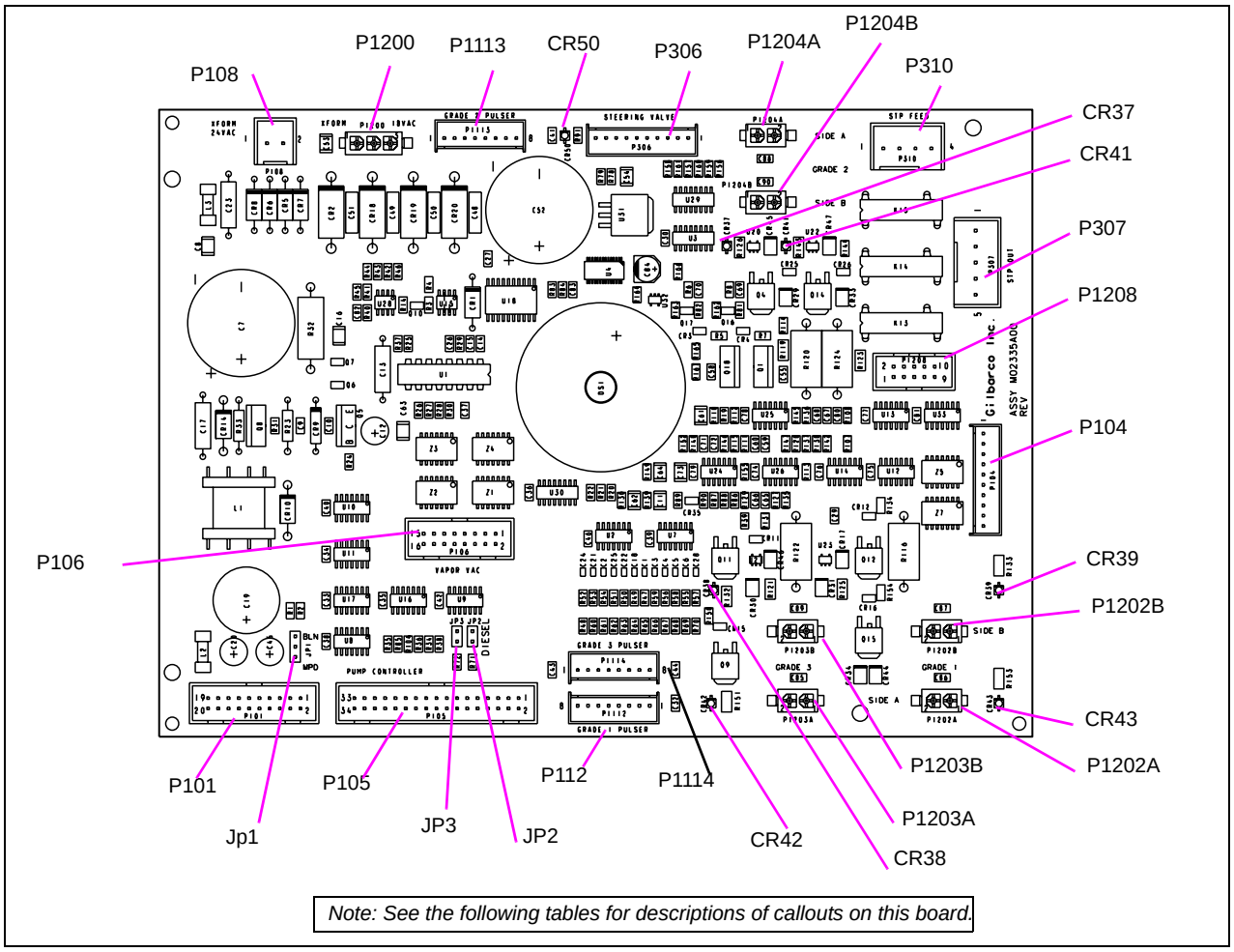
M02335A001 Valve Converter PCA

This board is used with the Encore 300 equipped with proportional valves. Other parts to convert existing digital valve units to proportional valve units. The board is the Proportional Control Flow Valve (PFCV) equivalent to the digital valve hydraulic interface board. The function of this board is similar to the Advantage T20076-G3 Hydraulic Interface PCA.

Service Tip

Voltage to coils typically varies from 10 to 18 VDC during operation depending upon operating conditions. Coil resistance is 40 to 45 Ohms.

Figure 6-27: Steering Valve Relay Board M02335A001



Note: See the following tables for descriptions of callouts on this board.

Status LEDs

LED	Status Indication
CR 37	On indicates current to P1204A
CR 38	On indicates current flow to the corresponding valve
CR 39	
CR 41	On indicates current to P1204B
CR 42	On indicates current flow to the corresponding valve
CR 43	

Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P101 (20 pin)	R17995-G7	VaporVac/ATC option	
	M01667A001	ATC option	
P104 (10 pin)	M02971A001	Pump Controller PCA M01598A001	J106
P105 (34 pin)	R19667-G1	Pump Controller PCA M01598A001	J205
P106 (16 pin)	M01666A001	Vapor recovery controller T19401-G1	
P108 (2 pin)		Main Power Supply M042274	J108
P306			
P307 (5) pin	field wiring	Junction box	
P310 (4 pin)	M01687A		J310 or P604
P1112 (8 pin)	M02651A001	Pulser -T18350-G8	P1
P1113 (8 pin)	M02651A001	Pulser -T18350-G8	P1
P1114 (8 pin)	M02651A001	Pulser -T18350-G8	P1
P1200 (3 pin)		Main Power Supply M042274	J108
P1202A (2 pin)	M02958A001	Valve B1	J1202A
P1202B (2 pin)	M02958A001	Valve A1	J1202B
P1203A (2 pin)	M02958A001	Valve A3 (see Note 1)	J1203A
P1203B (2 pin)	M02958A001	Valve B3 (see Note 1)	J1203B
P1204A (2 pin)	M02958A001	Valve A2 (see Note 2)	J1204A
P1204B (2 pin)	M02958A001	Valve B2 (see Note 2)	J1204B
P1208			

Notes:
1. Omit for Dual and Quad
2. Omit for Dual

Jump Jacks

Jump Jack	Purpose/Status
JP1	For VaporVac only (blender or MPD)
JP2	Side 1, Enables or disables VaporVac for the +1 Product. In = enabled, out = disabled
JP3	Side 2, Enables or disables VaporVac for the +1 Product. In = enabled, out = disabled

T17764-G3/4 CRIND Z180 Logic Board

This board is used in the Encore series units. Each dispenser can have up to two CRIND logic boards (one per side). Side 1 communicates directly with the dispenser controller board (via the hydraulic interface board) through connector P262, except on generic systems. Side 2 communicates to the dispenser through the side 1 logic board through P264.

T17764 is a Z180 based microprocessor with input/output (I/O) ports. I/O ports connect to the card reader, keypad, display, speaker, printer controller board, and regulator board. The logic board controls CRIND two-wire communications. Jump jacks set the CRIND polling address and other options. The CRIND logic board uses +5 VDC from the regulator board. The logic board transfers +68 VDC from the regulator board to the CRIND display board. The logic board has a built-in lithium battery rated at 3.5 Volts and provides VRAM during loss of power. This battery is not field replaceable.

CRIND BIOS on the logic board is in ROM at U7. This firmware contains software that defines pump control, device control (I/O ports), power-up tests, communications and diagnostics.

The site controller downloads customer-specific applications such as display prompts and ISO tables to logic board RAM, through the CRIND regulator board.

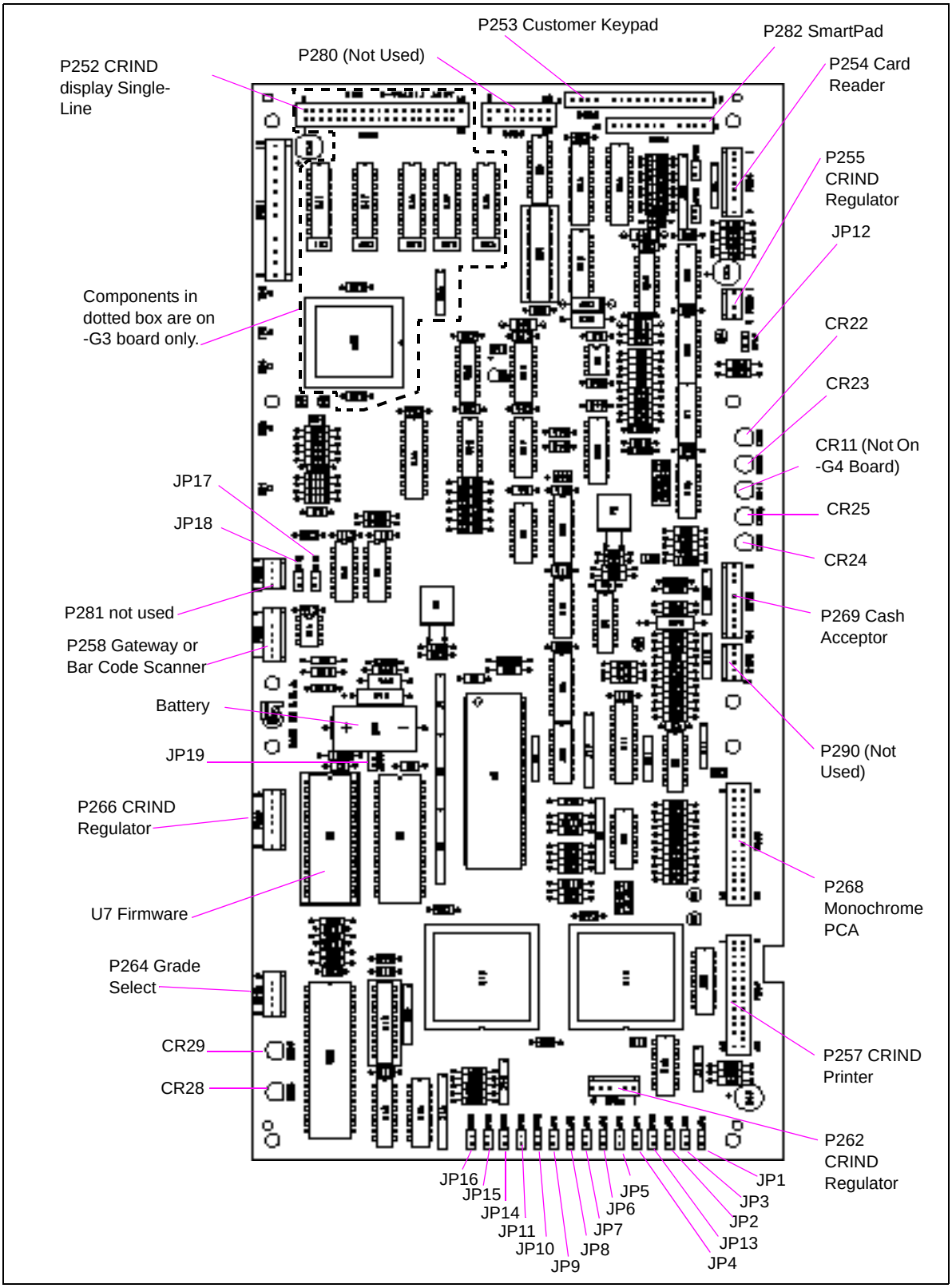
The -G4 is for InfoScreen®/Monochrome only. It is a simplified version of the -G3, without the VF display interface components

Service Tips

MOC CRINDs do not require communication with the dispenser to download. If CRIND cannot communicate to the dispenser, the CRIND will stop at pump startup once download is complete. If MOC CRIND is not communicating with the dispenser, check the LEDs on the Hydraulic Interface board. During loss of communication with the dispenser, the Pump In and Pump Out LEDs on the CRIND logic boards may still flash, due to communication between the Side 1 and Side 2 logic boards.

T17764-G3/G4 Boards

Figure 6-28: Z180 Logic Board - G3/G4



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P251 (12 pin)	M01668A002 harness	T20306-G1 CRIND Regulator PCA	P552 (12 pin)
P253 (17 pin)	M01555A001	Softkeys/Customer Keypad	12 pin
P254 (9 pin)		Card Reader	(7 pin)
P255 (4 pin)	M01668A002 harness	T20306-G1 CRIND Regulator PCA	J255 (4 pin)
P257 (30 pin)	M01668A001 (Side 1) M01668A002 (Side 2)	Printer Controller	CN2 (30 pin)
P258 (7 pin)	M01804A001	Side 2 CRIND Logic Board TRIND Gateway Board	P258 (7 pin) J250 (14 pin)
P262 (6 pin)	M01650A001 harness	T20306-G1 CRIND Regulator PCA (Side 1 only)	cable harness
P264 (6 pin)	M01650A001 harness	Encore 300 Electronics M01522A001 Single PPU Board M01621A001 Totalizer Interface PCA	cable harness
P266 (8 pin)	M01668A001 (Side 1) M01668A002 (Side 2)	T20306-G1 CRIND Regulator PCA	P569 (8 pin, Side 1) P570 (8 pin, B Side)
P268 (30 pin)	M01650A001	T19501-G2 Monochrome CPU PCA	P2013 (10 pin)

Note: Connectors not shown are not used at this time.

LED Indicators

LED	Status/Indicates
CR11	On = Indicates display circuit failure, replace logic board Off = Normal operation
CR22	Blinking = Receiving data from CPIB/pump
CR23	Blinking = Sending data to CPIB/pump
CR24	Fast flash = Receiving data from Cash Acceptor
CR25	Fast flash = Sending data to Cash Acceptor
CR28 *	Blinking = Receiving data from CRIND InfoScreen or Monochrome.
CR29 *	Blinking = Transmitting data to CRIND InfoScreen or Monochrome.

Test Points

Test Points	Voltages
TP1	VRAM +3 to +3.5 VDC Power Off; 5 VDC Power On
TP2	+5 V Unregulated
TP3	+5 V
TP4	+67 to +71 V (marked 59 V)
TP5	GND

Pin To Pin Tables

P251 (Regulator)

Test Point	Voltage
Pin 1	+5 V
Pin 2	+ 5V
Pin 3	GND
Pin 4	GND
Pin 5	Key
Pin 6	TXD G-SITE
Pin 7	RXD G-SITE
Pin 8	N/C
Pin 9	+5 V Unregulated
Pin 10	Cut
Pin 11	+58 V return
Pin 12	+58 V

P254 (Card Reader)

Test Point	Voltage
Pin 1	+5 V
Pin 6	Card inserted: +5 VDC No card inserted: 0 VDC
Pin 7	GND

P255 (Speaker Signals)

Test Point	Voltage
Pin 1	Speaker +
Pin 2	Key
Pin 3	N/C
Pin 4	Speaker –

P257 (Thermal Printer Signals)

Test Point	Voltage
Pin 24	GND
Pin 25	+5 V

P258 (Thermal Printer Signals)

Test Point	Voltage
Pin 2	GND
Pin 4	+5 V

P262 (Modular Two-Wire A)	
Test Point	**Voltage**
Pin 1	Pump data in
Pin 2	Pump data out
Pin 3	Key
Pin 4	N/C
Pin 5	GND
Pin 6	Side A select

P268 (Spare I/O)	
Test Point	**Voltage**
Pin 6	Cash acceptor door sensor
Pin 14	GND
Pin 17	+5 VDC
Pin 18	GND
Pin 19	RXD (InfoScreen/ Monochrome)
Pin 20	TXD (InfoScreen/ Monochrome)
Pin 22	GND
Pin 29	InfoScreen identifier
Pin 30	Monochrome identifier

P269 (Cash Acceptor)	
Test Point	**Voltage**
Pin 1	+5 V
Pin 2	Data in
Pin 3	GND
Pin 5	Data out
Pin 6	LRC removed signal
Pin 9	+ 5V
Pin 10	GND

P282 (SmartPad)	
Test Point	**Voltage**
Pin 1	+5 V
Pin 2	GND
Pin 3	Button Press
Pin 4	SmartPad RXD
Pin 6	SmartPad TXD

P290 (Voice Output Module)	
Test Point	**Voltage**
Pin 1	GND
Pin 2	VOM Data
Pin 3	+5 V
Pin 4	VOM Clock

Jump Jack Settings

Jump Jack	Setting/ Function	Setting/Function
JP1	In	In = Watch dog enable Out = Watch dog disable
JP2	Out	Card Reader, Inverts Active Low Clock Signals
JP3	Out	Card Reader, Inverts Active Low Data Signals
JP4-JP8	In/Out	CRIND Address* - See “CRIND Logic Board Address Settings” on page 6-66.
JP9	Out	Diagnostics, IN - Enters Diagnostic Mode At Power-Up
JP10	Out	Hydraulic Test, IN - Enters Hydraulic Test At Power-Up (MOC only). See “Baud Rate Settings” below.
JP11	Out In - G-CAT4	Coldstart, IN - Performs Coldstart At Power-Up Always IN for G-CAT 4.
JP12	In Out	IN - Single-line CRIND or CRIND with InfoScreen OUT - CRIND with Monochrome LCD (OUT lowers volume)
JP13	In-Side 1 Out-Side 2	Master/Slave Configuration (MOC only), IN - Sets CRIND As Side 1 (Master) JP13 has no affect for G-CAT4.
JP14	Out-MOC In-Generic	Selects Generic or MOC, IN - Sets CRIND for generic JP14 is not used with G-CAT4.
JP15	Out	Download selection menu.
JP16	Out	Spare (MOC only).
JP17*	Out*	Spare
JP18*	Out*	Spare
JP19*	IN *	BIOS selector, IN - Generic BIOS only
JP20*	Out*	Spare
JP21*	Out*	Spare

CRIND Logic Board Address Settings

MOC and Generic CRIND and G-CAT 4 Addresses (Table 1)

Address	JP8	JP7	JP6	JP5	JP4
1	IN	OUT	OUT	OUT	OUT
2	OUT	IN	OUT	OUT	OUT
3	IN	IN	OUT	OUT	OUT
4	OUT	OUT	IN	OUT	OUT
5	IN	OUT	IN	OUT	OUT
6	OUT	IN	IN	OUT	OUT
7	IN	IN	IN	OUT	OUT
8	OUT	OUT	OUT	IN	OUT
9	IN	OUT	OUT	IN	OUT
10	OUT	IN	OUT	IN	OUT
11	IN	IN	OUT	IN	OUT
12	OUT	OUT	IN	IN	OUT
13	IN	OUT	IN	IN	OUT
14	OUT	IN	IN	IN	OUT
15	IN	IN	IN	IN	OUT
16	OUT	OUT	OUT	OUT	IN
17	IN	OUT	OUT	OUT	IN
18	OUT	IN	OUT	OUT	IN
19	IN	IN	OUT	OUT	IN
20	OUT	OUT	IN	OUT	IN
21	IN	OUT	IN	OUT	IN
22	OUT	IN	IN	OUT	IN
23	IN	IN	IN	OUT	IN
24	OUT	OUT	OUT	IN	IN
25	IN	OUT	OUT	IN	IN
26	OUT	IN	OUT	IN	IN
27	IN	IN	OUT	IN	IN
28	OUT	OUT	IN	IN	IN
29	IN	OUT	IN	IN	IN
30	OUT	IN	IN	IN	IN
31	IN	IN	IN	IN	IN
32	OUT	OUT	OUT	OUT	OUT

Generic CRIND (Table 2)

Address	JP8	JP7	JP6	JP5	JP4
1	OUT	OUT	OUT	OUT	OUT
2	IN	OUT	OUT	OUT	OUT
3	OUT	IN	OUT	OUT	OUT
4	IN	IN	OUT	OUT	OUT
5	OUT	OUT	IN	OUT	OUT
6	IN	OUT	IN	OUT	OUT
7	OUT	IN	IN	OUT	OUT
8	IN	IN	IN	OUT	OUT
9	OUT	OUT	OUT	IN	OUT
10	IN	OUT	OUT	IN	OUT
11	OUT	IN	OUT	IN	OUT
12	IN	IN	OUT	IN	OUT
13	OUT	OUT	IN	IN	OUT
14	IN	OUT	IN	IN	OUT
15	OUT	IN	IN	IN	OUT
16	IN	IN	IN	IN	OUT
17	OUT	OUT	OUT	OUT	IN
18	IN	OUT	OUT	OUT	IN
19	OUT	IN	OUT	OUT	IN
20	IN	IN	OUT	OUT	IN
21	OUT	OUT	IN	OUT	IN
22	IN	OUT	IN	OUT	IN
23	OUT	IN	IN	OUT	IN
24	IN	IN	IN	OUT	IN
25	OUT	OUT	OUT	IN	IN
26	IN	OUT	OUT	IN	IN
27	OUT	IN	OUT	IN	IN
28	IN	IN	OUT	IN	IN
29	OUT	OUT	IN	IN	IN
30	IN	OUT	IN	IN	IN
31	OUT	IN	IN	IN	IN
32	IN	IN	IN	IN	IN

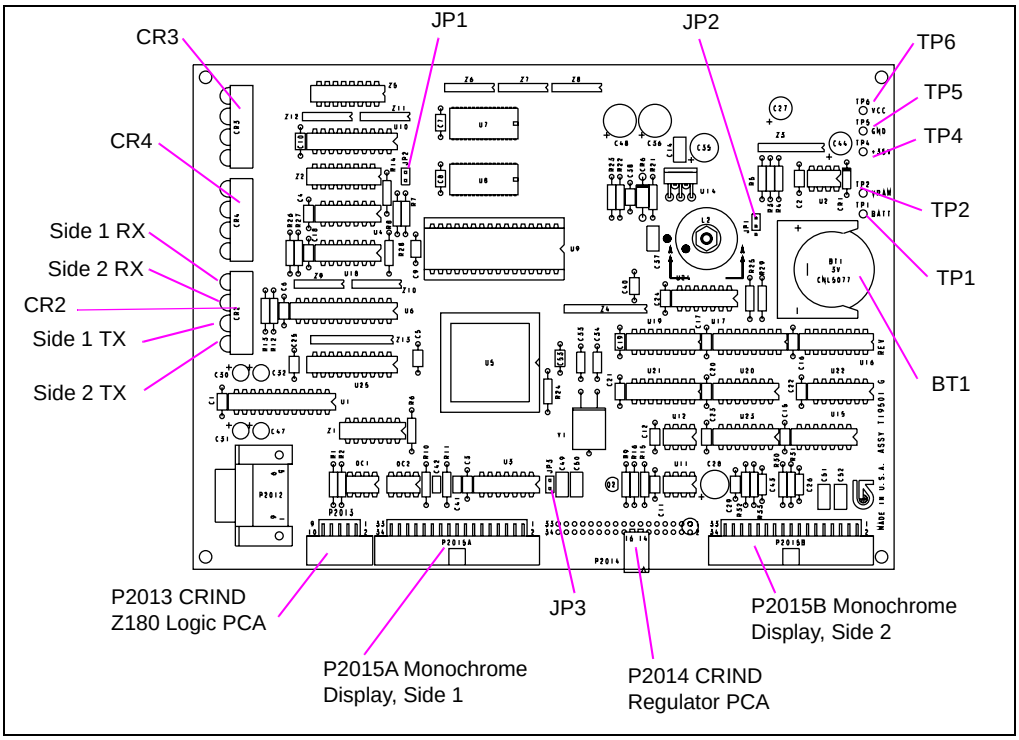
T19501-G2 Monochrome CPU PCA

This board is used on CRIND devices with monochrome LCDs in the Encore 300 series units. It stores all graphics and fonts to be displayed. Graphics and fonts are downloaded from the G-SITE system after a coldstart is performed. It then sends the graphics and fonts images to the LCD display.

Service Tip

This board functions similar to the -G1 used in some early and recent Advantage units but has a different mounting hole pattern.

Figure 6-29: Monochrome CPU Board T19501



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P2013 (10 pin)	M01650A001 harness	T17764-G3/4 CRIND Z180 Logic Board	J268A to Side 1 (30 pin) J268B to Side 2 (30 pin)
P2014 (2 pin)	M01663A001	T20306-G1 CRIND Regulator PCA	SK2 (6 pin)
P2015A (34 pin)	M01668A001 (Side 1)	Q13908-01 Monochrome Graphic Display	J1 (34 pin)
P2015B (34 pin)	M01668A0002 (Side 2)		

Jump Jack Settings

Jump Jack	Position	Function
JP1	A ON B ON OFF	Resets monochrome CPU Disables watchdog Enables watchdog
JP2	OFF	PPPRX
JP3	OFF	PPPTX

LED Indicators

LED	Indicates
CR2-1	Receiving data, A side
CR2-2	Receiving data, B side
CR2-3	Transmitting data, A side
CR2-4	Transmitting data, B side
CR3	Error code indicators.
CR4	

Connectors

P2013 interfaces the Monochrome. Pins 1, 2, 4, and 5 connect to P268A of CRIND Logic board. Pins 3 and 6 connect to P268B.

P2013 (Monochrome Interface)	
Pin	**Function/Voltage**
Pin 1	CRIND Power, disables monochrome communication circuits if VDC is not present.
Pin 2	CRIND A side RX
Pin 3	CRIND B side RX
Pin 4	CRIND GND
Pin 5	CRIND A side TX
Pin 6	CRIND B side TX

P2014	
Pin	**Function/Voltage**
Pin 14	GND
Pin 16	+5 VDC supplied by the dispenser’s regulator board

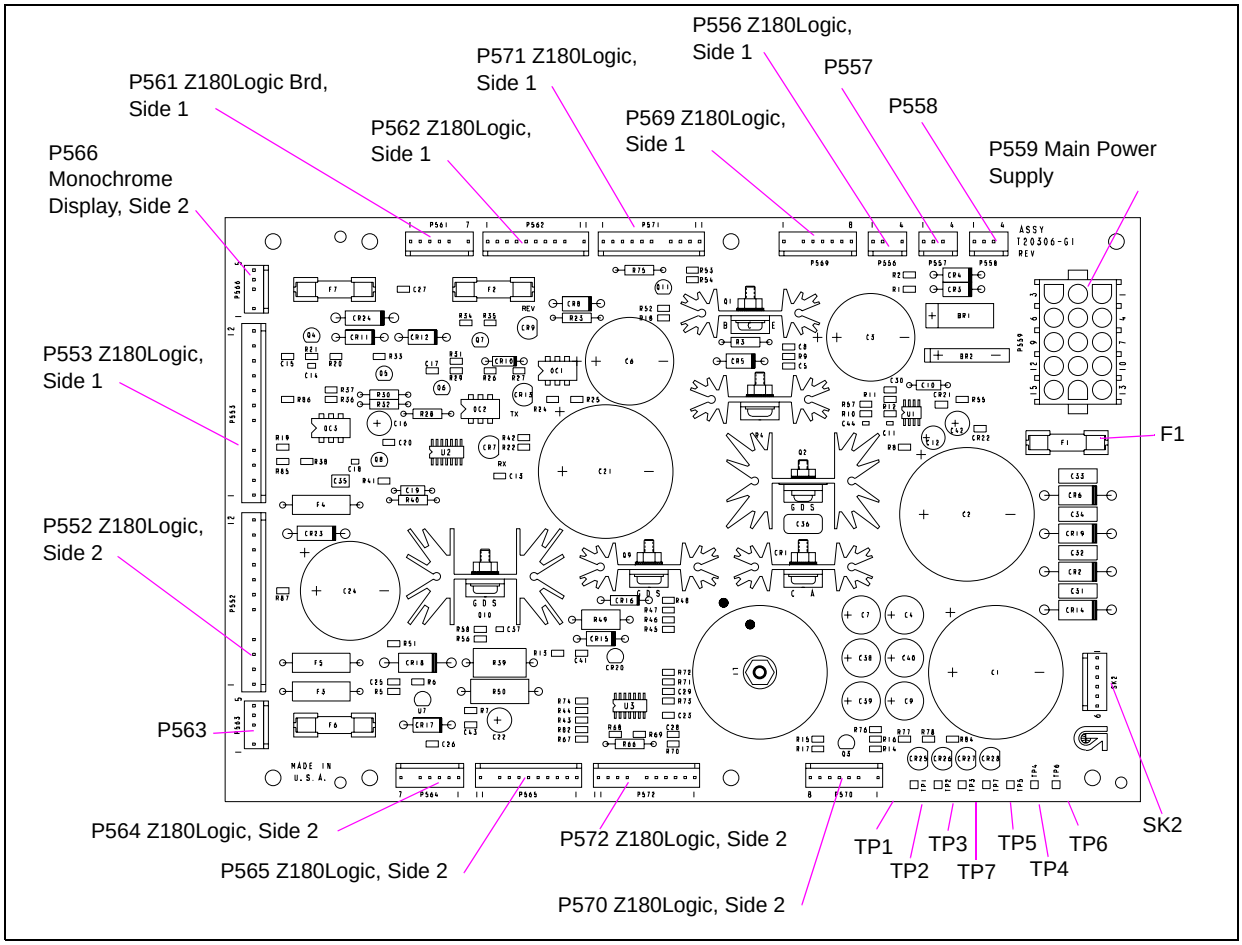
Test Points

Test Point	Voltage
TP1 (BATT)	2.8 VDC or higher, with power ON or OFF Power OFF to the monochrome CPU requires dispenser power to be removed and dispenser battery to be disabled.
TP2 (VRAM)	4.5 VDC with power ON 2.2 to 3 VDC with power OFF
TP4	+35 V
TP5 (GND)	GND
TP6 (VCC)	+5 VDC

T20306-G1 CRIND Regulator PCA

The CRIND regulator supplies regulated voltages for CRIND devices and receives and transmits communication signals from and to the POS system.

Figure 6-30: CRIND Regulator Board T20306-G1



Status LEDs

LED	Color	Function
CR7	Red	Two-wire - Receive Communication
CR9	Red	Two-wire - Reversed
CR13	Red	Two-wire - Transmit Communication
CR25	Red	5 V Present
CR26	Red	59 V Present
CR27	Red	5 V Present
CR28	Red	24 V Present

Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P552 (12 pin)	M01668A002 harness	T17764-G3/4 CRIND Z180 Logic Board Side 2	P251 (12 pin)
P553 (12 pin)	M01668A001 harness	T17764-G3/4 CRIND Z180 Logic Board Side 1	
P556 (4 pin)	M01650A001 harness	T17764-G3/4 CRIND Z180 Logic Board Side 1 M01664A001 harness to field wiring	J262 (6 pin) P412 (4 pin)
P557 (4 pin)			
P558 (4 pin)			
P559 (15 pin)	M01662A001	M01608A00 Main Power Supply	J606 (6 pin)
P561 (7 pin)	M01668A001 harness	T17764-G3/4 CRIND Z180 Logic Board Side 1	harness
P562 (11 pin)			
P563 (5 pin)		Q13908-01 Monochrome Display (Side 1)	J5 (2 pin)
P564 (7 pin)	M01668A002 harness	T17764-G3/4 CRIND Z180 Logic Board Side 2	harness
P565 (11 pin(			
P566 (5 pin)		Q13908-01 Monochrome Display (Side 2)	J5 (2 pin)
P569 (8 pin)	M01668A001 harness	T17764-G3/4 CRIND Z180 Logic Board Side 1	P266 (8 pin)
P570 (8 pin)	M01668A002 harness	T17764-G3/4 CRIND Z180 Logic Board Side 2	
P571 (11 pin)	M01668A001 harness	T17764-G3/4 CRIND Z180 Logic Board Side 1	harness
P572 (11 pin)	M01668A002 harness	T17764-G3/4 CRIND Z180 Logic Board Side 2	
SK2 (6 pin)	M01663A001	T19501-G2 Monochrome CPU PCA	P2014 (2 pin)

Test Points

Test Point	Voltage
TP1	+5 V (BATT)
TP2	+59 V (Single CRIND Display Voltage
TP3	+5 V
TP4	+5 V (Unregulated)
TP5	2.5 V
TP6	DC GND
TP7	+24 V

Power Supplies

The following table lists the contents in this sub-section.

Topic	Model	Page
M00488AXXX Voltage Select Plug	Encore 300, Encore 500 and Eclipse	6-72
M00050A001 Power Supply Board 18 VDC	Encore 500 and Eclipse	6-73
M00053A002 Power Supply Board 24 VDC		6-76
M00458A002 Encore 500 and Eclipse Power Supply		6-78
M01608A001 Encore 300 and Ultra-Hi Power Supply	Encore 300 and Ultra-Hi	6-79
M02274A001 Universal Power Supply for Encore 300, Encore 500 and Eclipse	Encore 500, Encore 500 and Eclipse	6-80
M02774A001 Universal Power Supply-2 PCA for Encore 500 and Eclipse	Encore 500 and Eclipse	6-82

For VaporVac power supplies, refer to "VaporVac Electrical Components" on page 6-115.

About Power Supplies

The function of the power supply is to provide clean voltage at the correct values required by the electronics.

Replacing Fuses

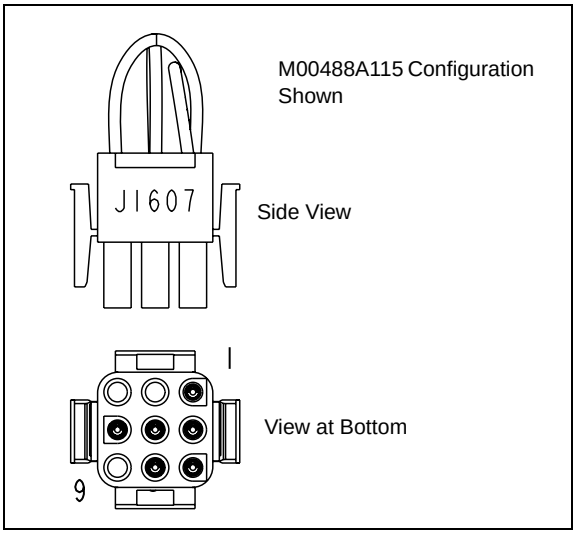
CAUTION

Using an incorrectly sized fuse may cause equipment damage. To ensure good equipment protection and maintain safe operation, always use the correct replacement fuse.

M00488AXXX Voltage Select Plug

The Encore 300, Encore 500 and Eclipse main power supplies use a voltage select plug to determine power supply AC voltage input. Voltage select plugs are not included and must be ordered separately. Voltage select plugs may also be reused from other power supplies or terminal block PCAs, as long as they are configured correctly. Use the following table to determine the correct voltage select plug.

Figure 6-31: Voltage Select Plug (M00488AXXX)



Voltage/Plug Designation

For This Voltage	Use This Plug
115	M00488A115
220	M00488A220
230	M00488A230

Jumper Configuration

This Plug	With This Voltage configuration	This Terminal	Connects To This Terminal
M00488A115	115	1	3
		5	6
		8	2
M00488A220	220	1	7
		5	2
M00488A230	230	1	4
		5	2

M00050A001 Power Supply Board 18 VDC

M00050A001 Board supplies 18 VDC power to LON system on Encore 500 and Eclipse series units, and has LEDs for ‘Power’ and ‘Fault’. It is used in M00458A002 (now obsolete) power supply assembly. In addition to rectifying the transformer secondary, it has a connection for a large filter capacitor, and has over and under-voltage detection. It also provides an advance power fail detection, has over-current sensing, and auto power-down timing. The M00050A001 board is capable of shutting down electronics. This board along with the M00458A002 assembly has been replaced by M02274A001. These boards are not interchangeable.

Troubleshooting Power Supply

The following procedure should be used for diagnosing 18 V Power Supply Problems. M00050 18 V Power supply board Revision "G" and later incorporate a very quick protective circuit to prevent the transformer fuse from blowing. With "G" boards, cycling power will allow the system to supply power again providing that an overcurrent condition does not occur.

1. With power on, measure AC voltage from the transformer to the M00050 board. Voltage should read 12 to 25 VAC if the system is good.

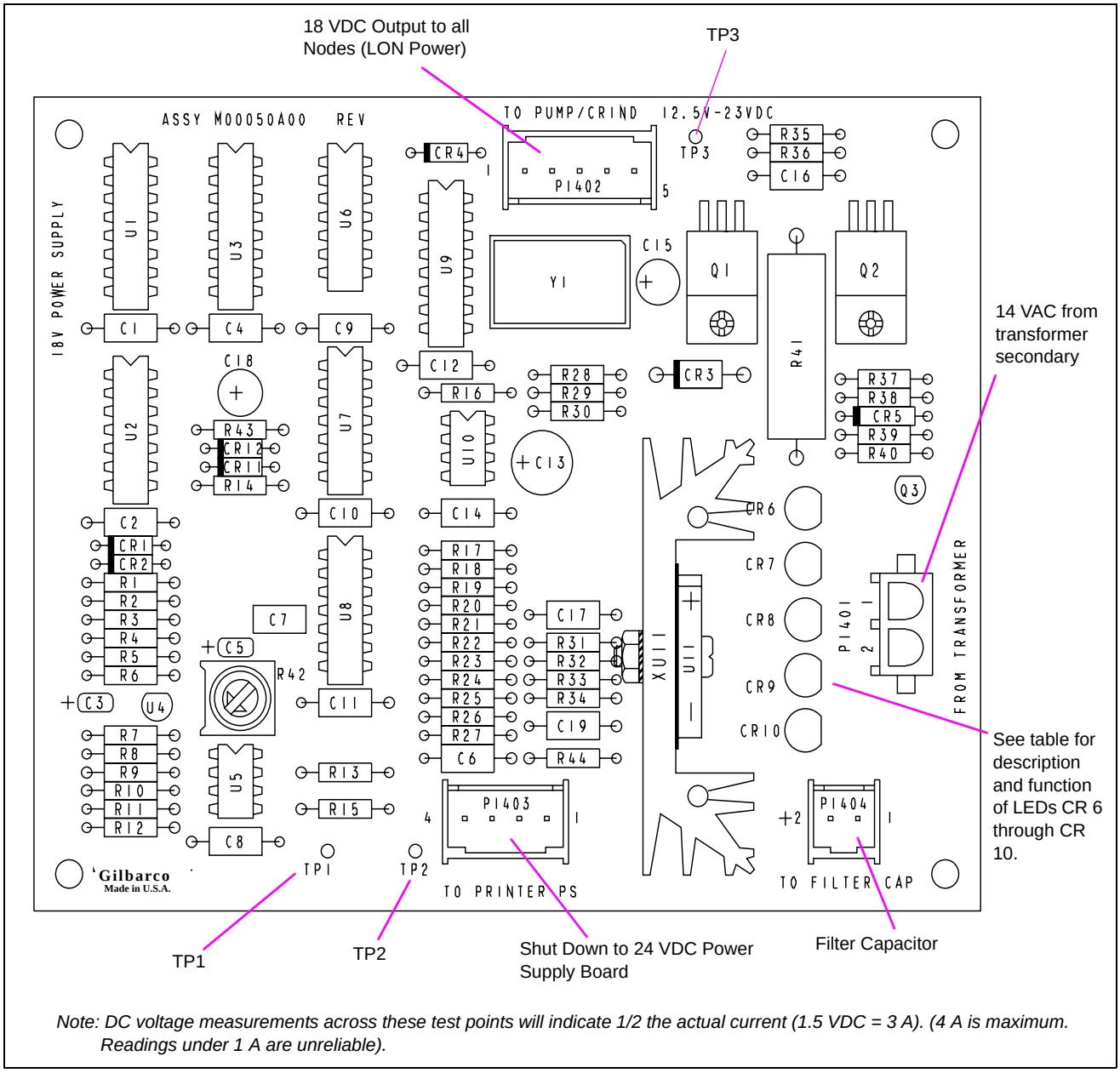
2. If the system has a fault (very low voltage), you will need to check the transformer and perform the following steps.
   - With power off, you can remove the transformer connector to the M00050 Supply board and check resistance across the wires from the transformer. Resistance should be very low, 5 ohms or less, if good.
   - If very high, the transformer is bad (open). Do not replace any transformer until you find the reason for its failure, or the new transformer may also fail.

3. With power off, at the M00050 board, remove the 5 pin cable to the pump node.
   - Measure ohms across pins 1 and 5. If ok, you will see 800 ohms or more, depending upon the number of options in the system. If bad, resistance will be very low and there is likely a fault with one of the nodes/boards using 18 V.
   - To find the bad node or board, you will need to temporarily disconnect the node/board from the 18 V supply and determine if the ohm reading returns to 800 or more.
   - Although unlikely to occur, if no bad node or board is found, a cable problem could exist. Use a test cable to temporarily replace each cable in the chain, measuring ohms, until the defective cable is found.

4. If you find any faulty node, board or cable, replace it, reconnect all cables properly and then check for a proper ohm reading again across pins 1 and 5.

5. Replace the transformer if it was found defective.

Figure 6-32: Power Supply M00050A001



Note: DC voltage measurements across these test points will indicate 1/2 the actual current (1.5 VDC = 3 A). (4 A is maximum. Readings under 1 A are unreliable).

Status LEDs

LED	Color	Function
CR 6	Green	Power IN
CR 7	Green	Power OUT
CR 8	Red	Power supply shut down
CR 9	Red	Fault
CR 10	Red	Overvoltage

Test Points

Test Point	Range
TP 1	System current draw. See Note.
TP 2	DC GRND
TP 3	12.5 V to 28 VDC

Note: Calculate system current draw as follows: Current = 2X indicated voltage. Circuit cannot indicate (provide reading) lower than 0.5 V

Board Connections and Cables

Connector#	Via Cable	To Board	at Connector#
P1401 (2 pin)	white wire	14 V Secondary on Power Supply	N/A
P1402 (5 pin)	M00635A001	+18 V to M00077A001 Totalizer Node	P1105
P1403 (4 pin)	M00486A001	M00053A002 Power Supply Board 24 VDC (Printer Option)	P3501
P1404 (2 pin)	M00484A001	Filter Capacitor	(2 pin)

Connector Pin Functions and Voltages

P1401

Pin #	Description	Voltage Range
1	Power In	12-24 VAC as measured to P1401-2
2	Power In	12-24 VAC as measured to P1401-1

P1402

Pin #	Description	Voltage Range
1	System Ground Reference (to System DC Ground)	0 V
2	System Ground Reference (to System DC Ground)	0 V
3	Power (Power) Fail Output	0.4 V = Power Fail 4 V = Power Good (Measured through external 10K pull-up)
4	System DC Power	22 V DC nominal, 17.5 VDC to 28 VDC operational
5	System DC Power	22 V DC nominal, 17.5 VDC to 28 VDC operational

P1403

Pin #	Description	Voltage Range
1	Supply Shutdown	0.4 V = Shutdown 4.0 V = Active
2	System Ground Reference	0 V
3,4	Not Used	

P1404

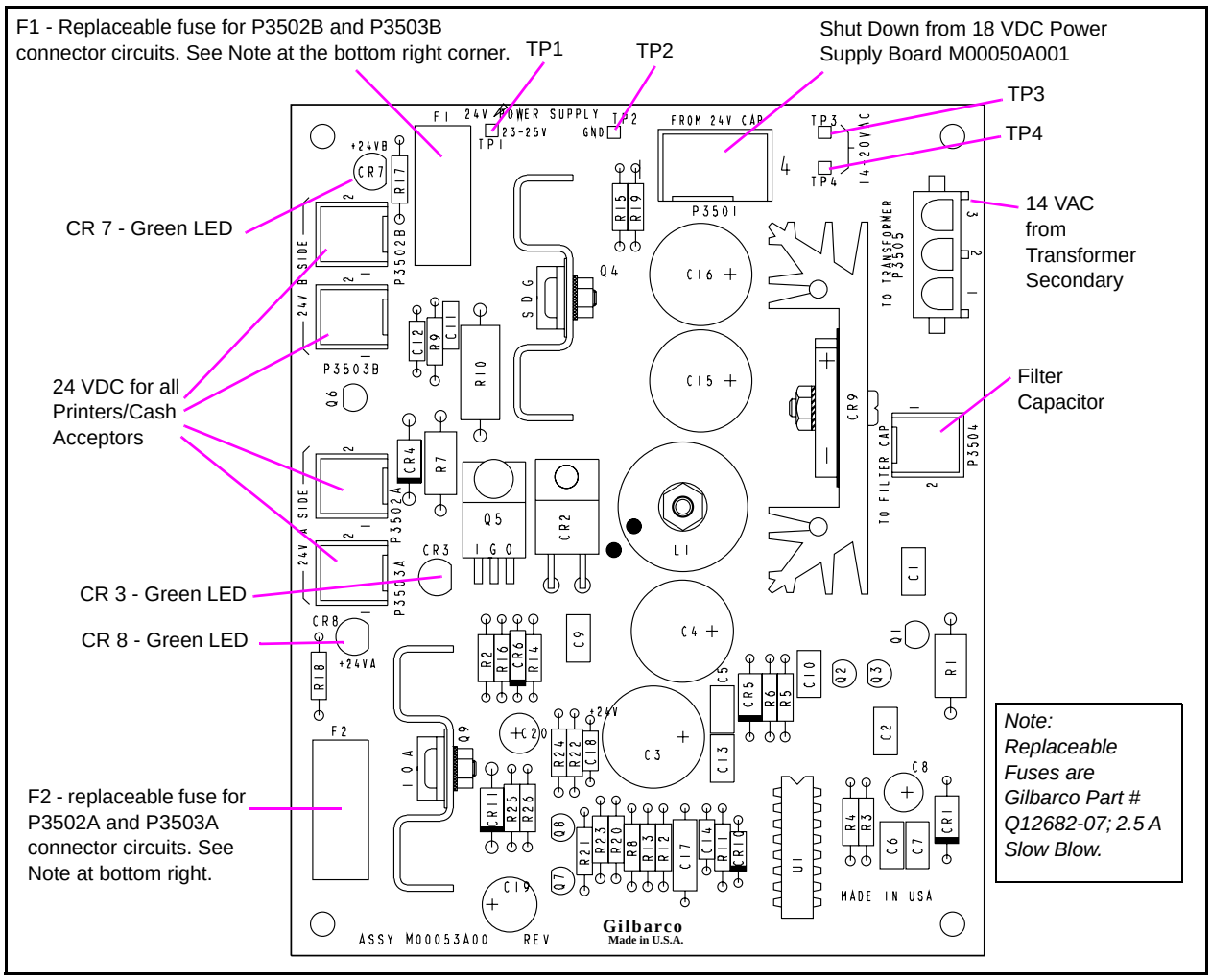
Pin #	Description	Voltage Range
1	System Ground Reference	0 V
2	18 V Filter Capacitor	18 VDC nominal, 15 VDC to 28 VDC operational

Note: Pins 3 and 4 of P1403 are presently not used. In future, +24 V board (M00053) may be powered through these pins, instead of through a dedicated transformer secondary.

M00053A002 Power Supply Board 24 VDC

On the Encore 500 and Eclipse series units, there are two 24 VDC power circuits on this board capable of supplying power to printers, barcode scanners and/or cash acceptors. LEDs are present on the board to indicate output for each side of this board. Board will shut down with a power fault from the 18 VDC power supply board M00050A001. This board has been obsoleted by the M02274A001 Power Supply. These parts are not interchangeable.

Figure 6-33: Power Supply Board M00053A002


F1 - Replaceable fuse for P3502B and P3503B connector circuits. See Note at the bottom right corner.
TP1
TP2
Shut Down from 18 VDC Power Supply Board M00050A001
TP3
TP4
CR 7 - Green LED
14 VAC from Transformer Secondary
24 VDC for all Printers/Cash Acceptors
Filter Capacitor
CR 3 - Green LED
CR 8 - Green LED
F2 - replaceable fuse for P3502A and P3503A connector circuits. See Note at bottom right.
Note: Replaceable Fuses are Gilbarco Part # Q12682-07; 2.5 A Slow Blow.
Gilbarco
Made in U.S.A.
MADE IN USA

Status LEDs

LED	Status Indication
CR3 GREEN	ON = good 24 VDC available. See Note.
CR7 GREEN	ON = good 24 VDC output to connectors P3502B and P3503B for Side 2 (Printers and/or Cash Acceptors) See Note.
CR8 GREEN	ON = good 24 VDC output to connectors P3502A and P3503A for Side 1 (Printers and/or Cash Acceptors) See Note.

Note: If CR3 is ON and CR7 and CR8 are both OFF one of two conditions exist:

- *Power Supply shutdown (check CR8 on M00050A001 Power Supply Board 18 VDC)*
  ~OR~
- *Both replaceable fuses are blown (unlikely)*

Test Points

Test Point	Range
TP 1	22.5 V to 25.5 VDC
TP 2	GRND
Reading across TP 3 and TP4	14 V to 25 VAC

Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P3501 (4 pin)	M00486A001	M00050A001 Power Supply Board 18 VDC	P1403 (4 pin)
P3502A (2 pin)	1. M00517A001 (Encore) or M00517A006 (Eclipse) 2. M00822B002	1. Printer Controller Side 1 2. Monochrome Fan	(2 pin)
P3502B (2 pin)	1. M00517A001 (Encore) or M00517A006 (Eclipse) 2. M00822B002	1. Printer Controller Side 2 2. Monochrome Fan	(2 pin)
P3503A (2 pin) *	M00721A001	Side 1 M00122A001 LON to Serial Node (LON Gateway)	P1512 (2 pin)
P3503B (2 pin) *	M00721A002	Side 2 M00122A001 LON to Serial Node (LON Gateway)	P1512 (2 pin)
P3504 (2 pin)	M00484A001	Filter Capacitor	2 pin
P3505 (3 pin)	Blue wire	14 V secondary on Power Supply	

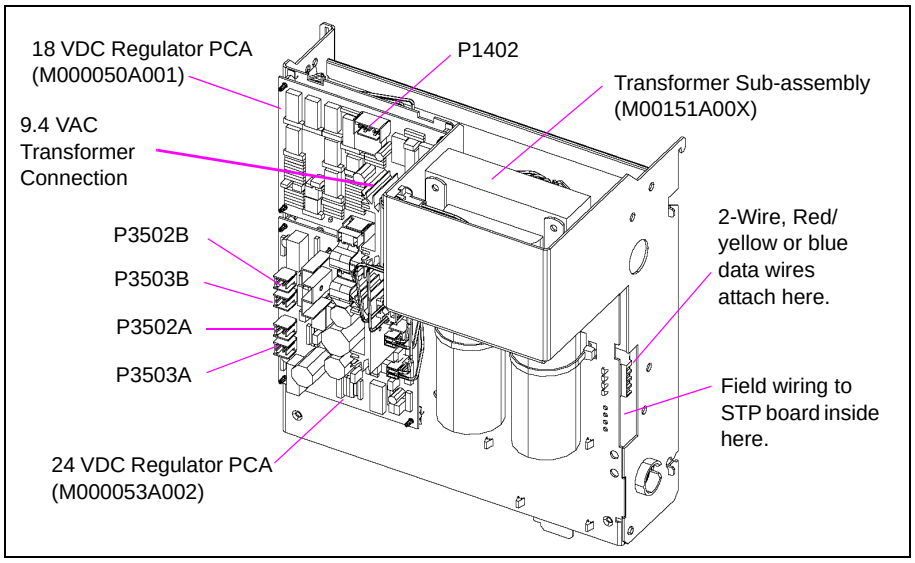
** Optional*

M00458A002 Encore 500 and Eclipse Power Supply

M00458A002 Power Supply Assembly

This power supply is no longer available and has been replaced by M02274. It is shown here for reference only. Refer to MDE-4133 Power Supply Kit M00016K003 Installation Manual for replacement instructions.

Figure 6-34: Encore Power Supply M00458A00X



Connections and Cables (Power Supply connections)

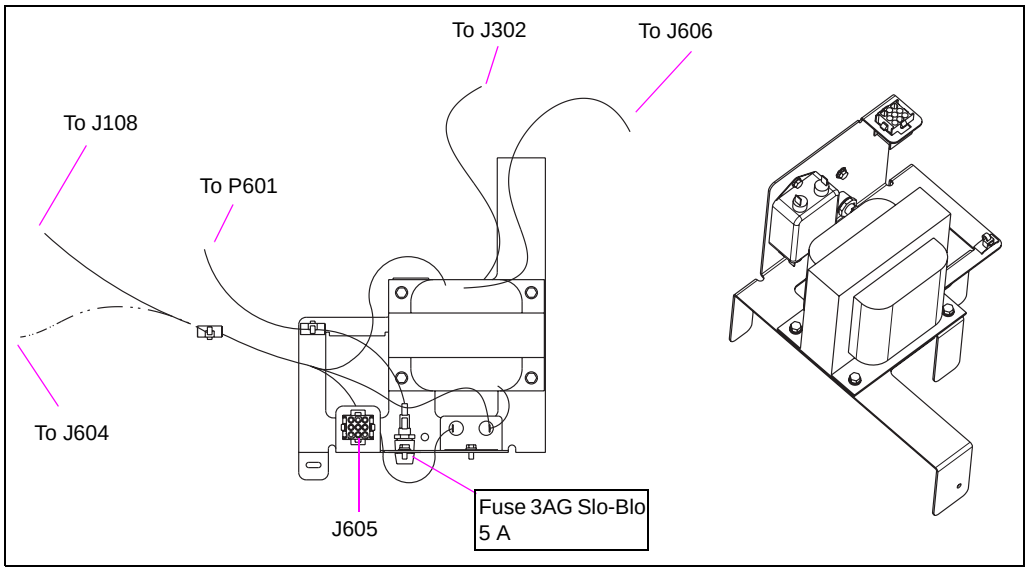
Connector#	Via Cable	To Board	At Connector#
P1402	M00635A003	Pump Control Node (M01922)	P1105
P3502A	M00715A005	Printer (M00317A001)	CN1
P3502B			
P3503A	Not used in this configuration		
P3503B			

M01608A001 Encore 300 and Ultra-Hi Power Supply

M01608A001 Main Power Supply Assembly

This power supply is obsolete and is replaced by M02274.

Figure 6-35: Power Supply for Encore 300



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P601	M01591A001	A2, A10, A13 field connection wires.	J401 (3 pin)
J604		Valve and STP feed	P604
J108		24 VAC Feed	P108
J302	M1650A001 to M01515A001	9.4 VAC Backlight voltage	J2115
J606	M01662A001	CRIND Regulator board (T20306-G1)	P559

M02274A001 Universal Power Supply for Encore 300, Encore 500 and Eclipse

The main assembly provides power to Encore 300, Encore Ultra-Hi, Encore 500 and Eclipse. This assembly was included in production units beginning December 5, 2002. Encore 500 and Eclipse units have an additional board attached to the main assembly to provide 18 and 24 volts. An STP board is also included in units that are dispensers.

Service Tip

This power supply can substitute for older power supplies using a M00016K003 kit.

Figure 6-36: Example of Encore 300 Configuration

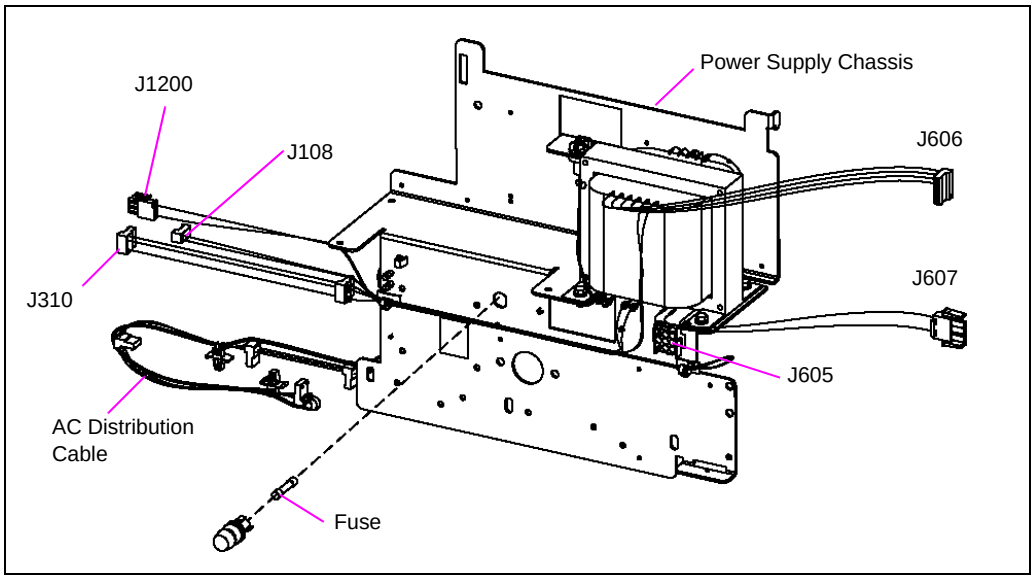


Figure 6-37: Example of Encore 500 and Eclipse Configuration

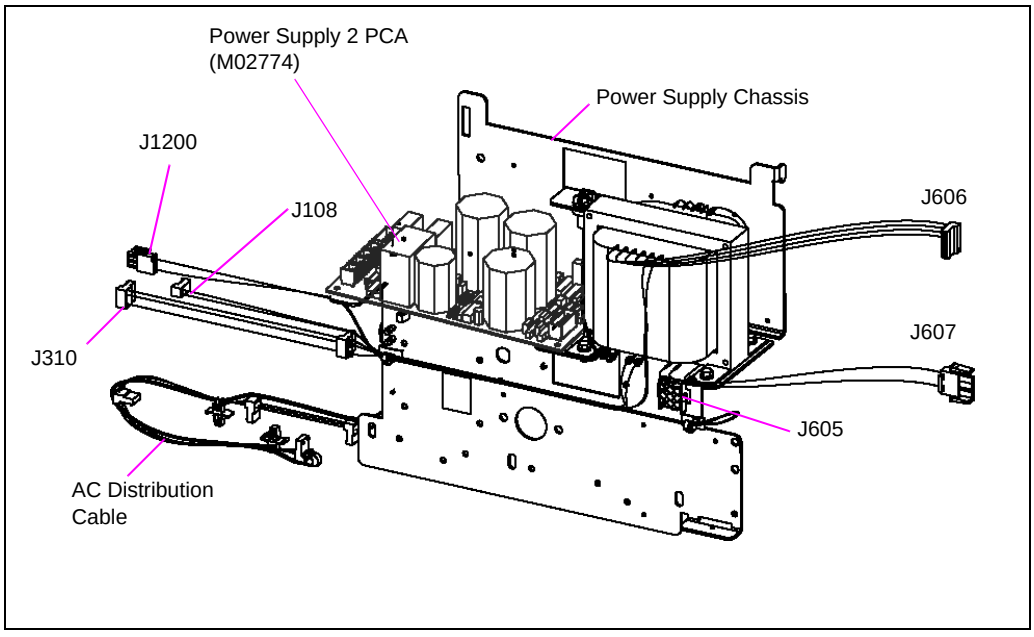
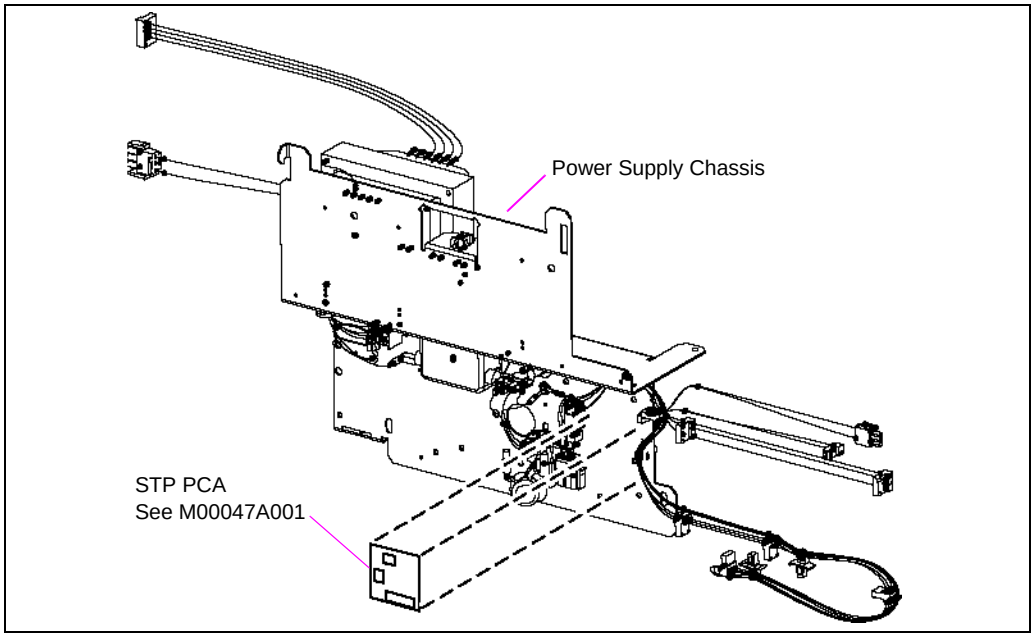


Figure 6-38: Universal Power Supply (Back) - STP Board Location



Board Connections and Cables

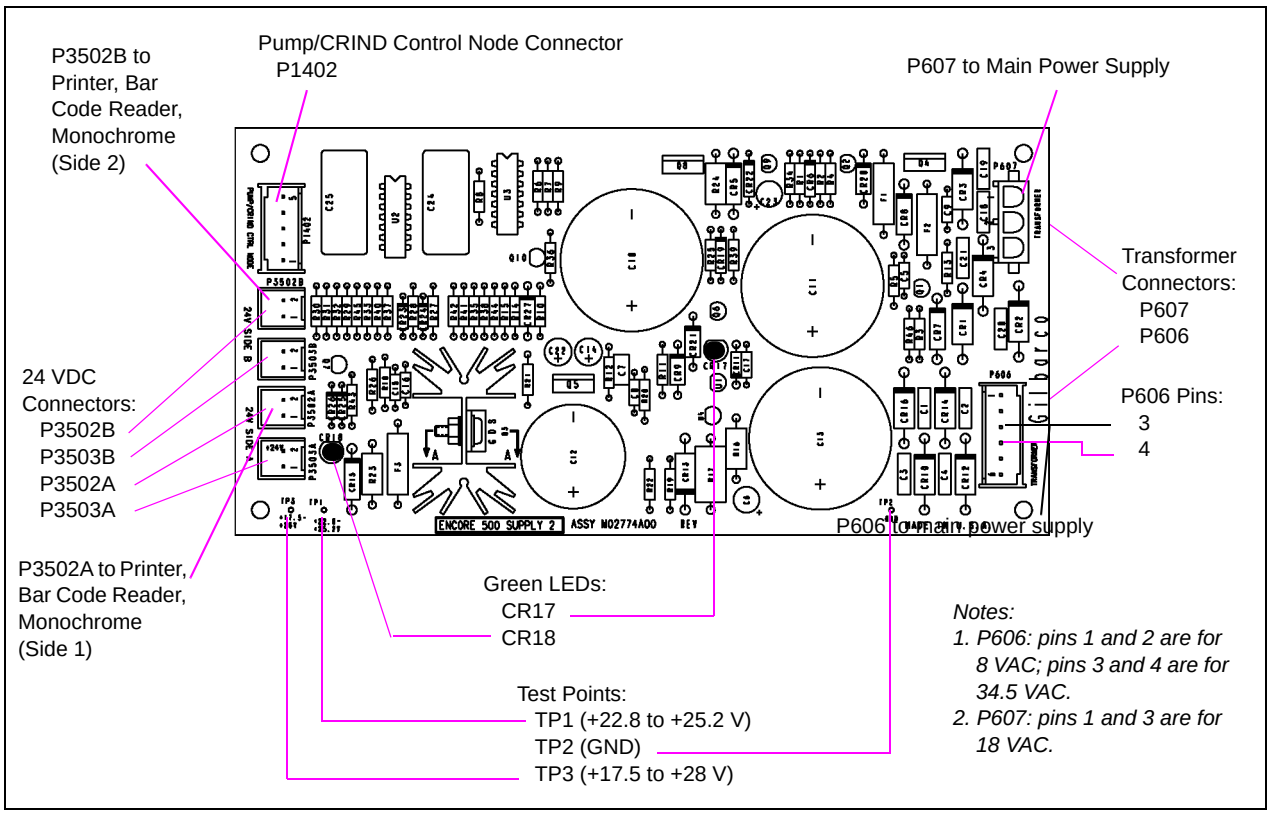
Model	Connector #	Via Cable	To Board	At Connector#
E500	J108	Not applicable to this configuration		
	J302	M00614A00X	Main Display (M01785A001)	J2115
	J310	M02954A001	STP board (M00047A001)	Terminal strip
	J604	Not applicable to this configuration		
	J605	N/A	Voltage plug (M00488AXXX)	J1607
	J606	Via attached cable	Power Supply-2 (M02774A001)	P606
	J607			P607
	J1200	Via attached cable	Valve Converter (M02044A00X)	P1200
	J1206	Not applicable to this configuration		
E300	J302	M01650A001	Main Display (M01515A001)	J2115
	J605	N/A	Voltage plug (M00488AXXX)	J1607
	J108	Via attached cable	Valve Converter (M02335A00X)	P108
	J310	Via attached cable	STP board (M00047A001)	Terminal strip
	J606	Not applicable to this configuration		P606
	J607			P607
	J1200	Via attached cable	Valve Converter (M02335A00X)	P1200
	J1206	Not applicable to this configuration		

Fuse

Description	Part Number
Fuse, 3AG Slo-Blo, 5 A	Q10131-04

M02774A001 Universal Power Supply-2 PCA for Encore 500 and Eclipse

Figure 6-39: Universal Power Supply PCA (M02774A001)


P3502B to Printer, Bar Code Reader, Monochrome (Side 2)
Pump/CRIND Control Node Connector P1402
P607 to Main Power Supply
Transformer Connectors: P607 P606
P606 Pins: 3 4
24 VDC Connectors: P3502B P3503B P3502A P3503A
P3502A to Printer, Bar Code Reader, Monochrome (Side 1)
Green LEDs: CR17 CR18
Test Points: TP1 (+22.8 to +25.2 V) TP2 (GND) TP3 (+17.5 to +28 V)
P606 to main power supply
Notes:
1. P606: pins 1 and 2 are for 8 VAC; pins 3 and 4 are for 34.5 VAC.
2. P607: pins 1 and 3 are for 18 VAC.

Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P606 (6 pin)	From Transformer	Main Power Supply (M02946A001)	J606
P607 (3 pin)			J607
P1402 (5 pin)	M00635	M01922	P1105
P3502A/B (2 pin)	M00517A/B	Printer, Barcode Reader, Monochrome	CN1

Status LEDs

LED	Status Indication
CR17	18 VDC
CR18	+24 VDC

Test Points

Test Point	Range
TP1	24 VDC
TP2	GND DC
TP3	18 VDC

Troubleshooting

Node Resistance Measurement Preparation

Node	What to Do Before Measuring Resistance Between Pins 1 and 5
Pump	Temporarily disconnect the LON cables to Pump Node.
CRIND device	Temporarily disconnect Monochrome Interface Board.
Last Node in Chain	Temporarily disconnect its LON cable and temporarily move the LON terminator to the node immediately upstream.
Others	Temporarily bypass them with a LON jumper cable.

LON Power Problem

A LON power problem can appear as pump power cycling off and on every 2 or 3 seconds, or as the pump logic boards having no power. Refer to the following If/Then table.

If...	Then...
Pump power cycles off and on every 2 to 3 seconds	1 Shut off power to the dispenser. 2 Disconnect 5-pin P1402 connector to the pump or CRIND node. 3 Reapply power to dispenser. If the power cycling stops, the pump or CRIND node may be defective. If the cable goes to a car wash kiosk, pin 3 on the cable might need to be omitted. *Note: The cable to a car wash kiosk should have a 002 suffix; all other CRIND cables should have a 001 suffix.*
Pump logic boards have no power - CR17 is not lit	1 Disconnect 3-pin P607 connector from M02774 board. 2 Measure AC voltage between pins 1 and 3 on the cable connector. If voltage across pins 1 and 3 is in 17 VAC and 35 VAC range, the M02774 board may be defective. If voltage across pins 1 and 3 is not in 17 VAC and 35 VAC range, the transformer on the M02274 power supply assembly may be defective. 3 Disconnect 5-pin P1402 connector from M02774 board. 4 Measure resistance across pins 1 and 5 on the cable connector. If 800 ohms or more, reconnect the cable to P1402, and power up the dispenser. This procedure is over. If under 800 ohms, proceed to next step. 5 To find bad node or board, temporarily disconnect each node/board one at a time and measure the resistance across pins 1 and 5 on the cable. If 800 ohms or more with board disconnected, replace the disconnected node/board. If under 800 ohms and each node/board has been temporarily disconnected, proceed to next step. *Note: Components using 18 V include all nodes and the monochrome board. The pump node receives 18 V from a direct plug-in while all other nodes receive 18 V over the LON cable.* If no bad board or node is found, a cable problem could exist. Use a test cable to temporarily replace each cable in the chain, measuring ohms (800 or more), until defective cable is found. If no defective cable is found, escalate the problem through normal channels. If defective cable is found, proceed to next step. 6 Replace defective cable. 7 Reconnect all nodes/boards and cables. 8 Power up dispenser.

24 VDC Problem

If one or more 24 VDC devices in the dispenser fails to operate, examine CR18 on M02774 and perform the action in the following If/Then table.

Note: Examples of 24 VDC devices are the CRIND printer, the monochrome display backlight, and the LED board for the bar code scanner.

If...	Then...
CR18 is lit	If you still have problems, trace out the connections from the M02774 board to the affected device. If you find a bad connection, fix the problem. If you are still not able to locate the source of the problem, verify the voltages with respect to ground (TP2) at test points TP1 and TP3. *Note: The 24 VDC power connection is made on any of P3502A, P3502B, P3503A, and/or P3503B*
CR18 is not lit	Either the M02774 board is bad or the transformer (part of the M02274 power supply assembly) feeding the 24 VDC section of the M02774 board is bad. Measure AC voltage across pins 3 and 4 on connector P606. The voltage should be in the 30 VAC to 40 VAC range. If not in that range, suspect the transformer. If in that range, suspect the M02774 board.

Displays, Main/PPU/CRIND

The components in this sub-section is grouped first by type, model, and then description.

Display Type	Model	Description	Page
Main and PPU	Encore 300	M01515A001 Main Display for Encore 300	6-86
		M02652A003 and A004 PPU Single Display Module for Encore 300	6-89
		M02652A007 and A008 PPU Dual Display Module for Encore 300	6-90
	Encore 300 and Encore 500	M02659A009 Satellite Indicator Display Module for Encore 300 and 500	6-97
	Encore 500 and Eclipse	M01785A001 Main Display for Encore 500 and Eclipse	6-92
		M02652A001 and A002 PPU-Single Display Module for Encore 500 and Eclipse	6-93
		M02652A005 and A006 PPU Dual Display Module for Encore 500 and Eclipse	6-95
CRIND	Encore 300	Single-line CRIND Display T20379	6-98
	Encore 300 and 500	Monochrome Display - E300 and 500	6-99

About Displays

The main display provides the customer with information about total cost and total volume of fuel dispensed.

PPU displays provide price-per-unit information to the customer.

The following table shows which PPUs also have reed switch Q11075-31 attached.

PPU Assembly Number	Encore Model	PPU Display Type	Reed Switch
M02652A009	Ultra-Hi	Single	None
M02652A008	300	Dual	None
M02652A007	300	Dual	Yes
M02652A006	500	Dual	None
M02652A005	500	Dual	Yes
M02652A004	300	Single	None
M02652A003	300	Single	Yes
M02652A002	500	Single	None
M02652A001	500	Single	Yes

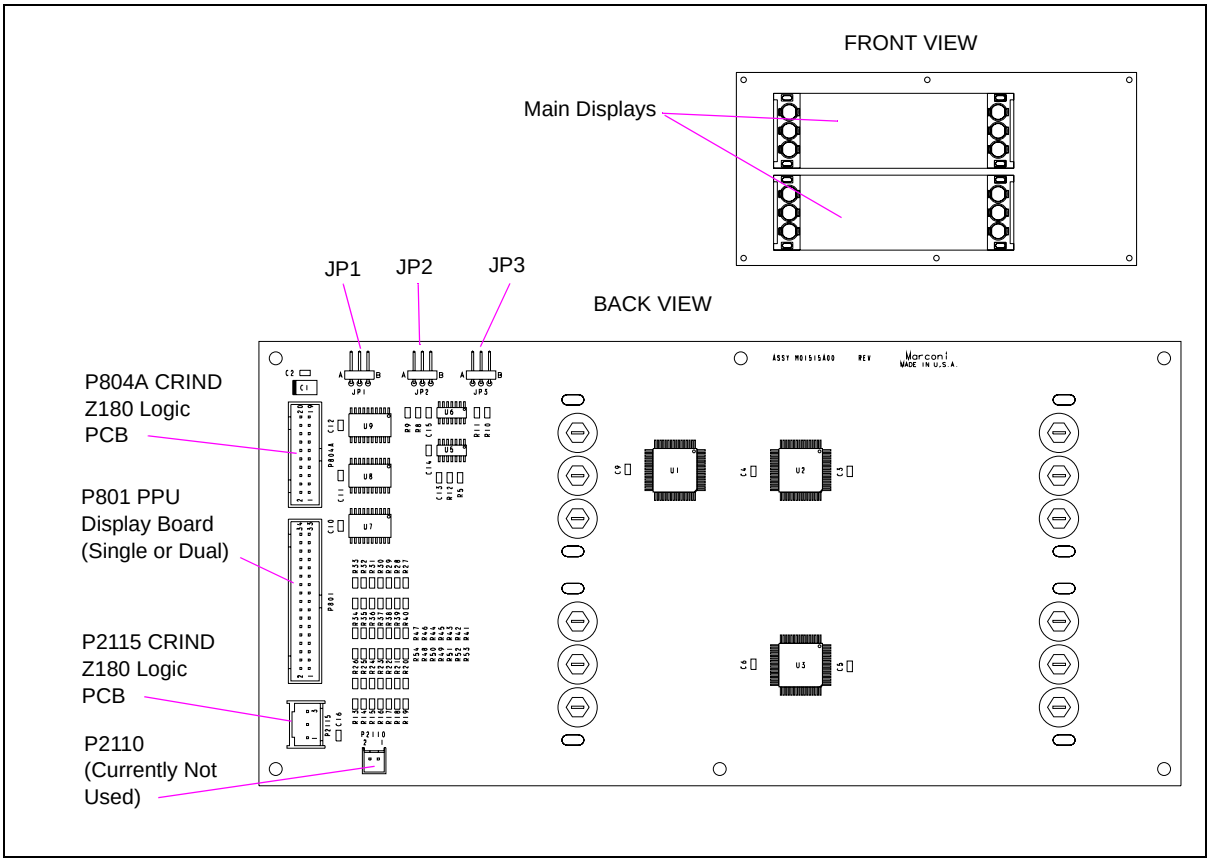
M01515A001 Main Display for Encore 300

This board is used in Encore 300 units to display the pump transaction information.

Service Tip

If one of the backlight bulbs burns out and the unit has been in service for quite some time, it is recommended that all backlight bulbs be replaced, as others are also probably near the end of their service life.

Figure 6-40: Main Display for Encore 300



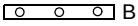
Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P801 (34 pin)	M01650A001	T17764-G3/4 CRIND Z180 Logic Board	P264 (6 pin)
		M01621A001 Totalizer Interface PCA	P1507 (12 pin)
		M01522A001 Single PPU Board	P2201 (2 pin)
		M01525A001 Dual PPU PCA	
P804A (20 pin)	M01585A001	M01522A001 Single PPU Board	P121 (20 pin)
		M01525A001 Dual PPU PCA	
P2110 (2 pin)	Currently not used		
P2115 (3 pin)	M01650A001	Same as P801 above.	J2115 (3 pin)

Test Points

Connector	Pin Number	Range	Current
P801	18	5 VDC, +/- 5%	70 mA
P801	20	0 VDC	
P2115	1to 3	9.4 VAC, +/1 10%	2.2 A

JP1 Jump Jack Settings

Side 1	A B
Side 2	A  B
Master Reset	A B

Connector Pin Functions and Voltage

P801 Pin Functions and Voltages

Pin #	Description	Voltage Range
1	MAIN-DATA-A3	0 to 5 V
2	MAIN-DATA-A2	0 to 5 V
3	MAIN-DATA-A1	0 to 5 V
4	MAIN-DATA-AO	0 to 5 V
5	MAIN-DATA-B3	0 to 5 V
6	MAIN-DATA-B2	0 to 5 V
7	MAIN-DATA-B1	0 to 5 V
8	MAIN-DATA-BO	0 to 5 V
9	Not used	
10	Not used	
11	COM-CONT	0 to 5 V
12	Not used	
13	CREDIT-ST	0 to 5 V
14	CASH-ST	0 to 5 V
15	DSEL1	0 to 5 V
16	DSEL0	0 to 5 V
17	ST3	0 to 5 V
18	5 V	5 V
19	ST2	0 to 5 V
20	GND	0 V
21	ST1	0 to 5 V
22	Not used	
23	STO	0 to 5 V
24	Not used	
25	CASH-DP	0 to 5 V
26	MSTR-RAM-CLR	0 V
27	VOLUME-DP	0 to 5 V
28	Not used	
29	PPU-DP	0 to 5 V

Pin #	Description	Voltage Range
30	Not used	
31	MAIN-ENABLE	0 to 5 V
32	Not used	
33	Not used	
34	Not used	

P804A Pin Functions and Voltages

Pin #	Description	Voltage Range
1	DO-DATA	0 to 5 V
2	D1-DATA	0 to 5 V
3	DGTSEL1	0 to 5 V
4	D2-DATA	0 to 5 V
5	DGTSELO	0 to 5 V
6	D3-DATA	0 to 5 V
7	ST-CRDT	0 to 5 V
8	ADD-A2	0 to 5 V
9	ADD-A0	0 to 5 V
10	ADD-A1	0 to 5 V
11	ADD-A3	0 to 5 V
12	5 V	5 V
13	ST-CASH	0 to 5 V
14	OPCOM3	0 to 5 V
15	GND	0 V
16	OPCOM4	0 to 5 V
17	OPDP4	0 to 5 V
18	OPDP3	0 to 5 V
19	OPDP2	0 to 5 V
20	OPBP	0 to 5 V

P2110 Pin Functions and Voltages

Pin #	Description	Voltage Range
1	9.4 VAC	9.4 VAC +/-10%
2	9.4 VACRTN	

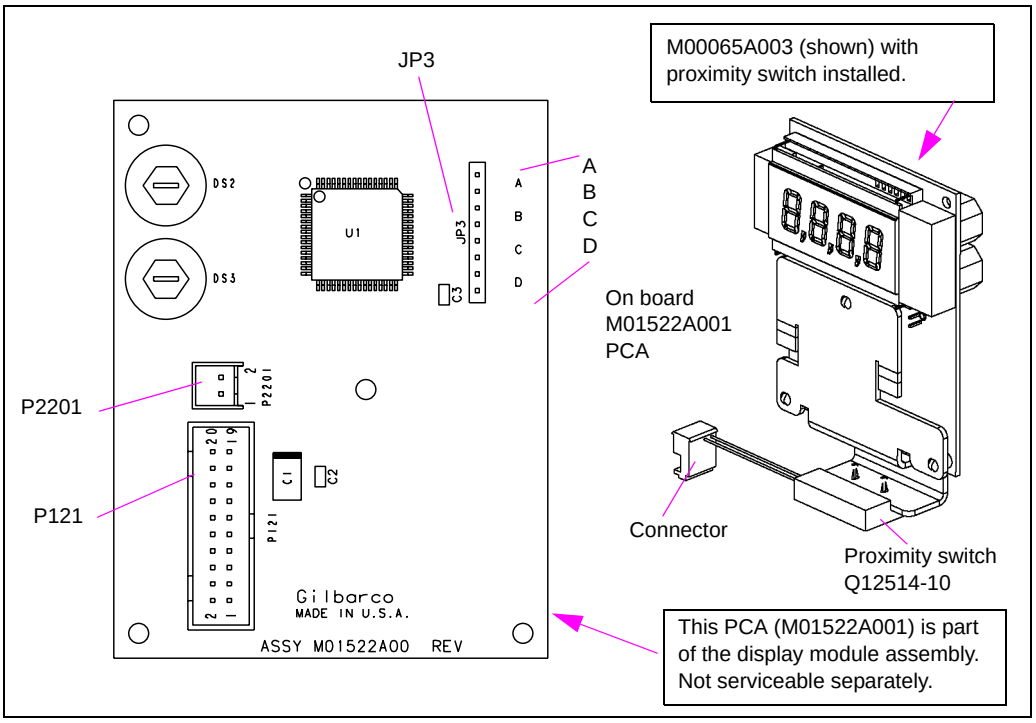
P2115 Pin Functions and Voltages

Pin #	Description	Voltage Range
1	9.4 VAC	9.4 VAC +/-10%
2	Not used	
3	9.4 VACRTN	9.4 VAC +/-10%

M02652A003 and A004 PPU Single Display Module for Encore 300

The single PPU display provides price-per-unit information to the customer on the Encore 300 and also reports grade selection and pump handle status. A proximity switch acts as a grade select switch. Module M02652A004 does not have the proximity switch.

Figure 6-41: PPU Module with Single Display for Encore 300



Board Connections and Cables

Note: Board and connections per grade.

Connector#	Via Cable	To Board	At Connector#
P121 (20 pin)	M01585A001	M01515A001 Main Display PCA	P804A (20 pin)
P2201 (2 pin)	M1586A001 or M01618A001	M01598A001 Pump Controller PCA	P204 (34 pin)

JP3 - Jump Jack Settings

Unit Type	Side	Grade	Jumper Setting
Standard MPD, Single Hose MPD and Six-hose Blenders	1 (formerly A)	1	A
		2	B
		3	A B
	2 (formerly B)	1	A C
		2	B C
		3	A B C
Selectable Blenders	1 (formerly A)	1	A
		2	B
		3	A B
		4	C
		5	A C
		6	B C
	2 (formerly B)	1	A B C
		2	D
		3	A D
		4	B D
		5	A B D
		6	C D

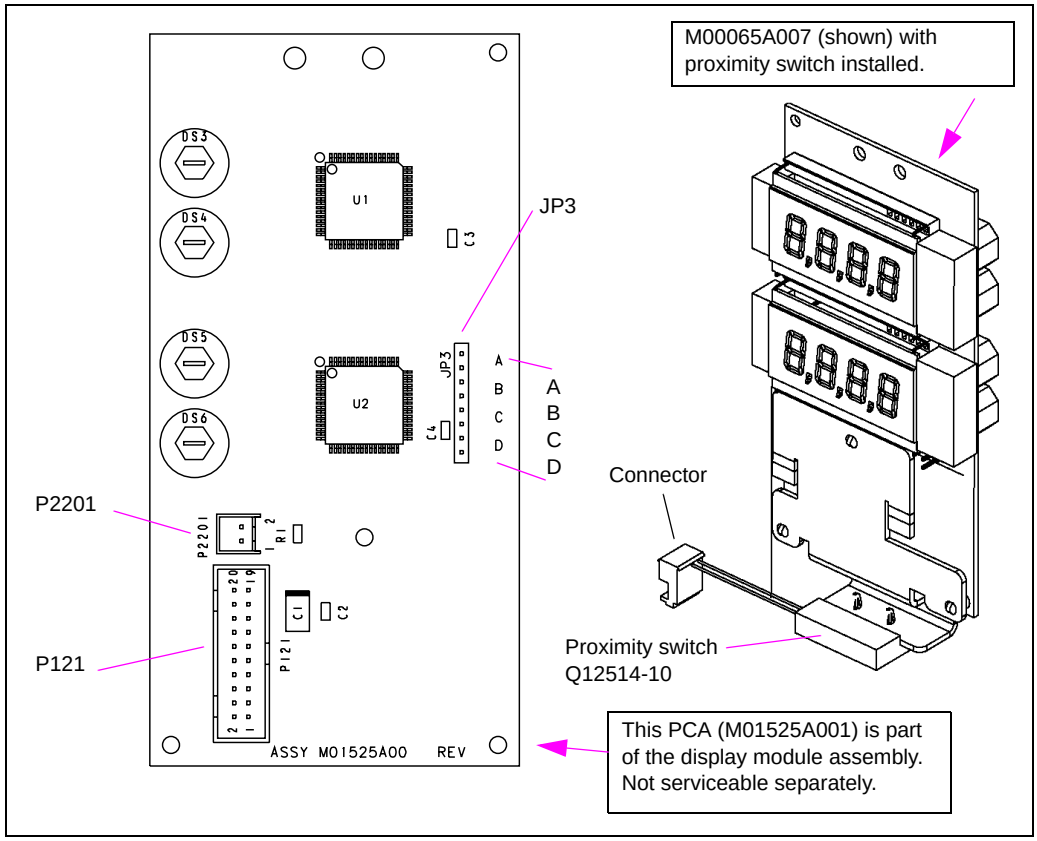
M02652A007 and A008 PPU Dual Display Module for Encore 300

The Dual PPU display module M02652A007 and A008 is capable of supplying dual level price-per-unit information to the customer. Grade selection and status is reported back to the CRIND device. Jumpers are used to set the addresses. A proximity switch that reports status of the pump handle is part of the M02652A007 module. Module M02652A008 does not have the proximity switch.

Service Tip

If one of the two backlight bulbs burns out, it is a good idea to replace both bulbs on that board.

Figure 6-42: PPU Module with Dual Display for Encore 300



Board Connections and Cables

Note: Board and connections per grade.

Connector#	Via Cable	To Board	At Connector#
P121 (20 pin)	M01585A001	M01515A001 Main Display PCA	P804A (20 pin)
P2201 (2 pin)	M1586A001 or M01618A001	M01598A001 Pump Controller PCA	P204 (34 pin)

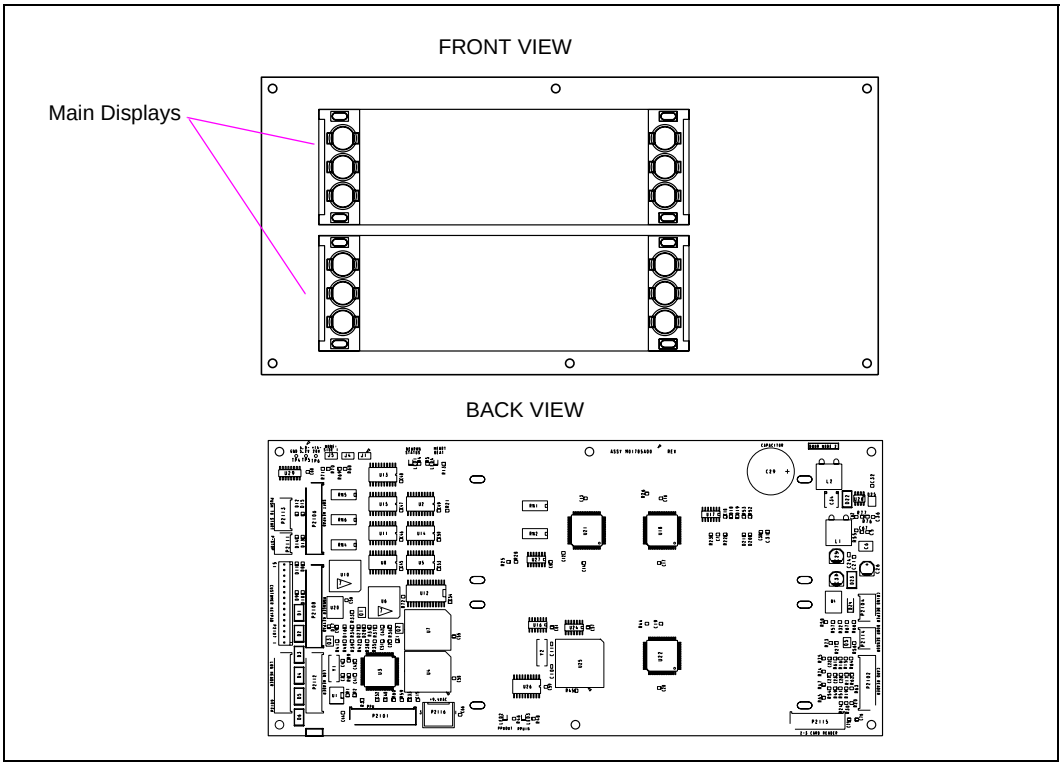
JP3 - Jump Jack Settings

Jump jack settings are the same for single and dual PPU displays. Refer to "JP3 - Jump Jack Settings" on page 6-90 for settings.

M01785A001 Main Display for Encore 500 and Eclipse

The main display is part of the Door Node-2 PCA on Encore 500 and Eclipse series units. Refer to “M01785A001 Door Node-2” on page 6-49 for information on connectors, status LEDs and test points.

Figure 6-43: Main Display/Door Node-2 for Encore 500 and Eclipse



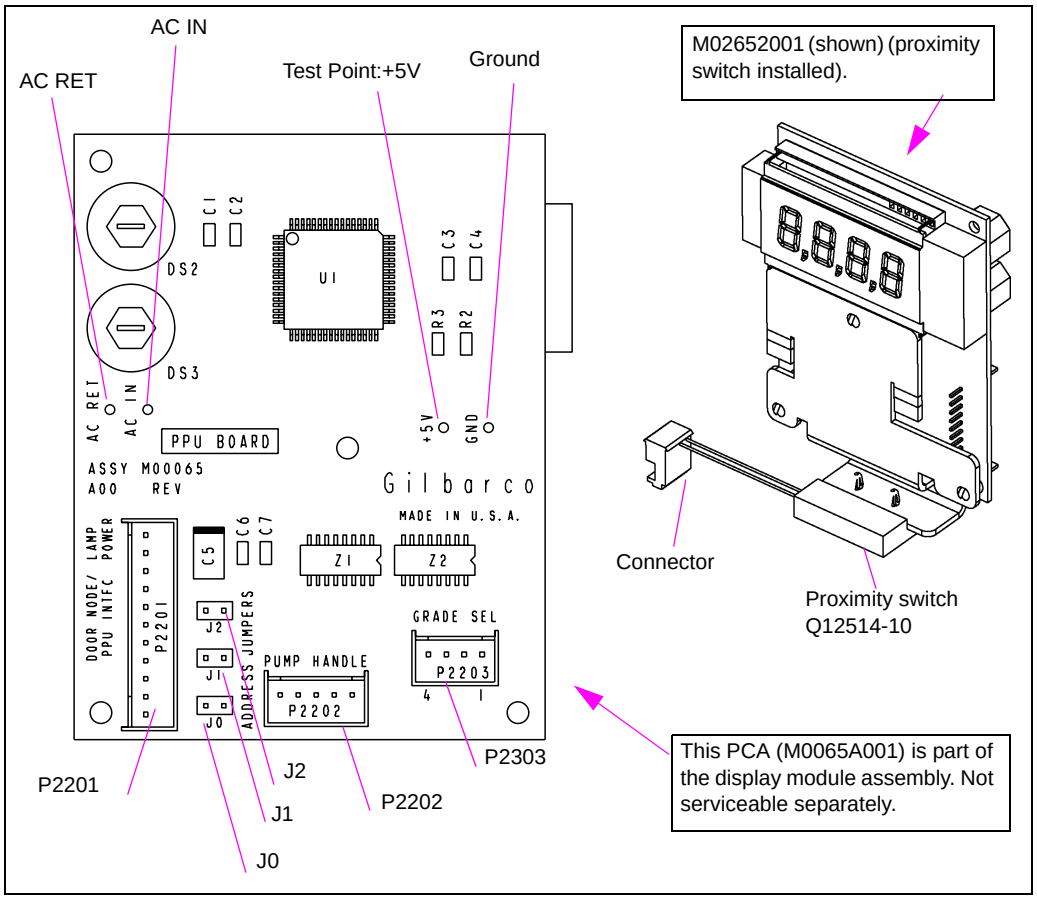
M02652A001 and A002 PPU-Single Display Module for Encore 500 and Eclipse

The single PPU display provides price-per-unit information to the customer and also reports grade selection and pump handle status information back to the pump node. A proximity switch that reports status of the pump handle is part of the M02652A001 module. Module M02652A002 does not have the proximity switch. The PPU displayed and the STPs activated will be determined by setting the jump-jacks.

Service Tip

It is recommended that you replace bulbs in pairs.

Figure 6-44: PPU Module with Single Display for Encore 500 and Eclipse



PPU Address Jumpers

Addresses can be set for up to 6 grades.

Jumper	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
J0	OUT	IN	OUT	IN	OUT	IN
J1	OUT	OUT	IN	IN	OUT	OUT
J2	OUT	OUT	OUT	OUT	IN	IN

Board Connections and Cables

Note: Board and connections per grade.

Connector#	Via Cable	To Board	At Connector#
P2201 (11 pin)	• M00509A001 or M00509A002 (Encore) • M00509A003 (Eclipse)	• M00095A001 CRIND Auxiliary I/O Board • M01785A001 Door Node-2 • M000062A001 Door Node-1	P2101
P2202 (5 pin)	M01152A001 (or in line with cable M00497A001 via J2202/P2202. See Note)	Pump Handle	
P2203 (4 pin)	M00628A001	Grade Select	

Note: M00497A001 used only when single hose MPD hose is on left grade 1 or grade select button is on far right.

Connector Pin Functions and Voltages

P2201

Pin #	Description	Input /Output Voltage
1	AC_IN	9.4 VAC
2	AC_RET	
3	GND	0 V
4	GND	0 V
5	PWR (+5 V)	+5 V +/-5%
6	CLK	0 to 5 V
7	FEEDBACK	0 to 5 V
8	SND_REC	0 to 5 V
9	PBP	0 to 5 V
10	SER_DATA	0 to 5 V
11	RESET	0 to 5 V

P2202

Pin #	Description	Input /Output Voltage
1	PUMP_HANDLE	0 to 5 V
2	+5 V	+5 V +/-5%
3	+5 V	+5 V +/-5%
4	PUMP_HANDLE_LB	0 to 5 V
5	GND	0 V

P2203

Pin #	Description	Input /Output Voltage
1	GRD_SEL	0 to 5V
2	+5 V	+5 V +/-5%
3	GRD_SEL_LB	0 to 5 V
4	+5 V	+5 V +/-5%

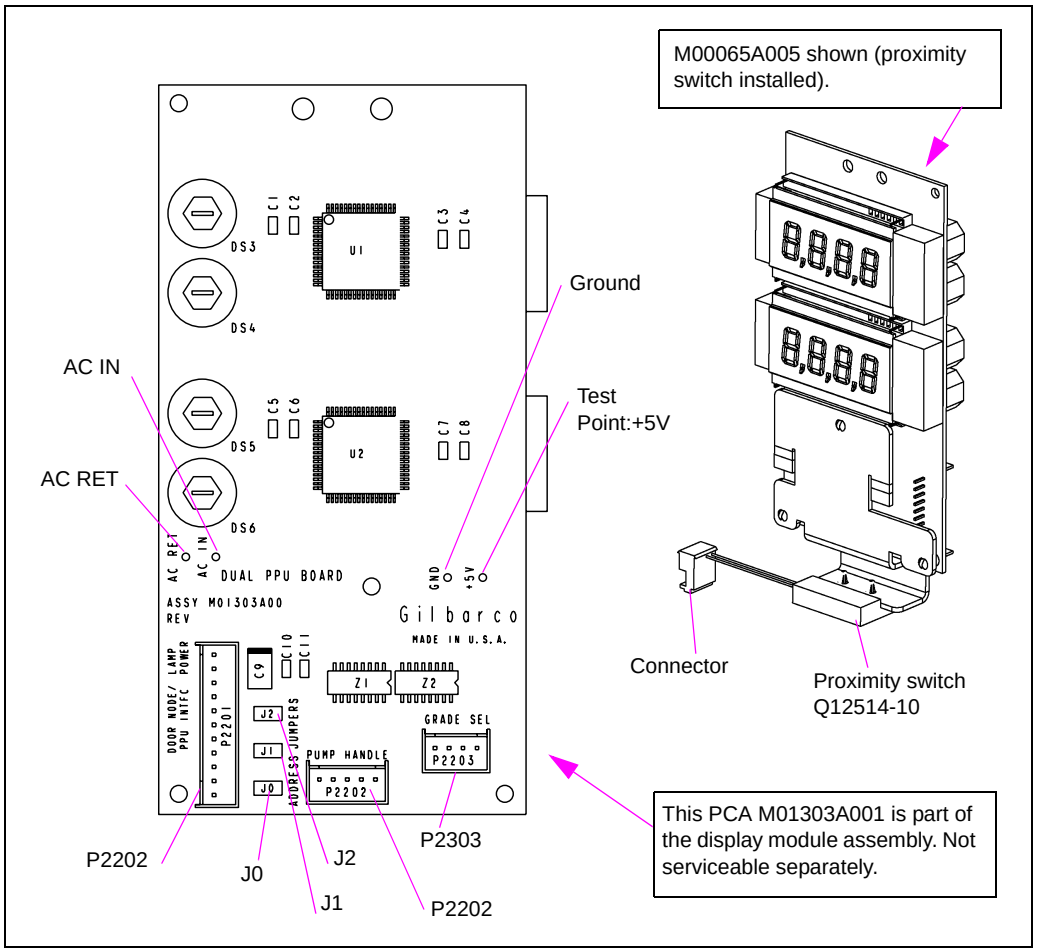
M02652A005 and A006 PPU Dual Display Module for Encore 500 and Eclipse

The Dual PPU display module M02652A005 and A006 is capable of supplying dual level price-per-unit information to the customer. Grade selection and status is reported back to M00095A001 CRIND Auxiliary I/O Board. Jumpers are used to set the addresses. A proximity switch that reports status of the pump handle is part of the M02652A005 module. Module M02652A006 does not have the proximity switch.

Service Tip

If one of the two backlight bulbs burns out, it is a good idea to replace both bulbs on that board.

Figure 6-45: PPU Module with Dual Display for Encore 500



PPU Address Jumpers

Addresses can be set for up to 6 grades.

Jumper	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
J0	OUT	IN	OUT	IN	OUT	IN
J1	OUT	OUT	IN	IN	OUT	OUT
J2	OUT	OUT	OUT	OUT	IN	IN

Board Connections and Cables

Note: Board and connections per grade.

Connector#	Via Cable	To Board	At Connector#
P2201 (11 pin)	• M00509A001 or M00509A002 (Encore) • M00509A003 (Eclipse)	M00095A001 CRIND Auxiliary I/O Board	P2101
P2202 (5 pin)	M01152A001 (or in line with cable M00497A001 via J2202/P2202. See Note)	Pump Handle	
P2203 (4 pin)	M00628A001	Grade Select	

Note: M00497A001 used only when single hose MPD hose is on left grade 1 or grade select button is on far right.

Connector Pin Functions and Voltages

P2201

Pin #	Description	Input /Output Voltage
1	AC_IN	9.4 VAC
2	AC_RET	
3	GND	0 V
4	GND	0 V
5	PWR (+5 V)	+5 V +/-5%
6	CLK	0 to 5 V
7	FEEDBACK	0 to 5 V
8	SND_REC	0 to 5 V
9	PBP	0 to 5 V
10	SER_DATA	0 to 5 V
11	RESET	0 to 5 V

P2202

Pin #	Description	Input /Output Voltage
1	PUMP_HANDLE	0 to 5 V
2	+5 V	+5 V +/-5%
3	+5 V	+5 V +/-5%
4	PUMP_HANDLE_LB	0 to 5 V
5	GND	0 V

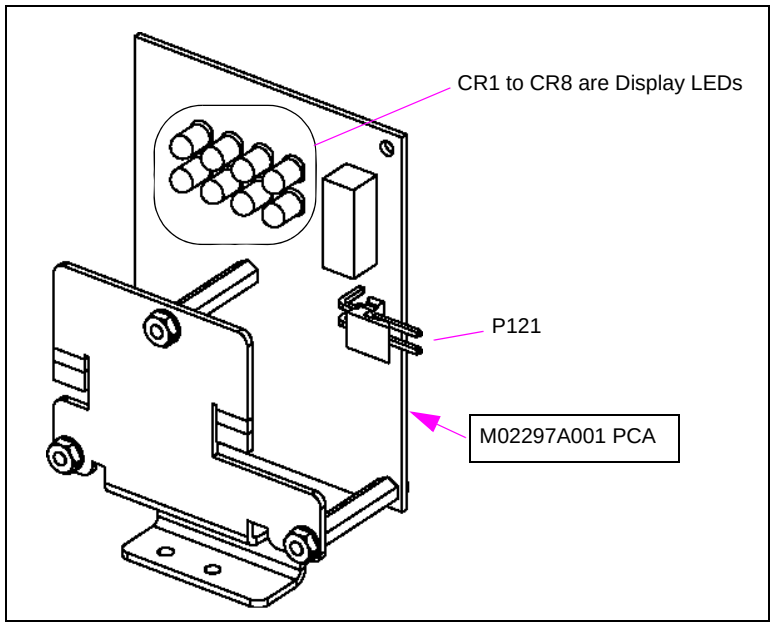
P2203

Pin #	Description	Input /Output Voltage
1	GRD_SEL	0 to 5 V
2	+5 V	+5 V +/-5%
3	GRD_SEL_LB	0 to 5 V
4	+5 V	+5 V +/-5%

M02659A009 Satellite Indicator Display Module for Encore 300 and 500

The satellite indicator display module is mounted in the Encore Ultra-Hi Master or master side of a satellite/master combo unit on Encore 300 Ultra-Hi and Encore 500 Ultra-Hi units. This display indicates that the nozzle boot handle has been lifted on the satellite unit that is connected by product piping and wiring with that master.

Figure 6-46: Satellite Indicator Display M02652A009



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P121 (2 pin)	M02371A001	Transformer sub-assembly M02370A001	JSEC

CRIND Devices

The following table lists the content in this sub-section.

Topic	Page
About CRIND Devices and Options	6-98
Single-line CRIND Display T20379	6-98
Monochrome Display - E300 and 500	6-99
CRIND Device Card Reader	6-102
Cash Acceptor	6-103
CRIND Printer Module	6-106
Bar Code Scanner	6-110

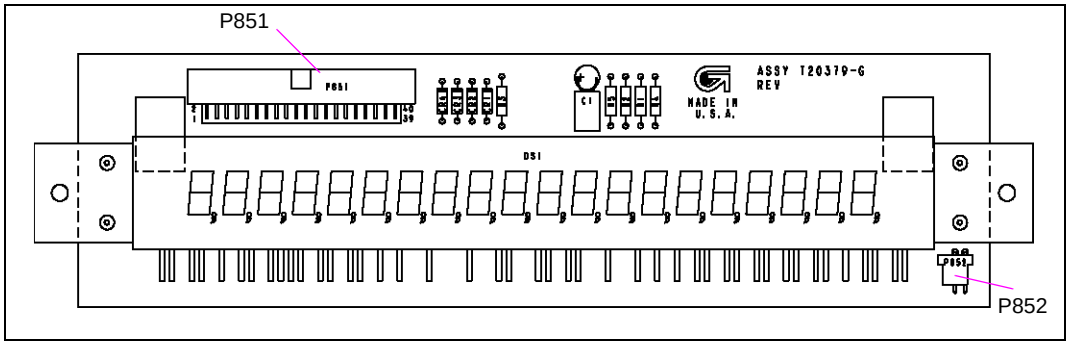
About CRIND Devices and Options

The Card Reader In Dispenser (CRIND) device is a customer-activated POS device located at or near the dispenser. The CRIND device allows customers to activate dispensers and pay for fuel and merchandise without help from the station attendants. The CRIND device can be set up to accept credit or debit cards. The CRIND device communicates with the site controller, which in turn communicates with credit, and/or debit networks. The CRIND device display prompts the customer through the transaction and depending on type, may display promotional information. The single-line CRIND displays prompts and messages on a 14 segment, 20 character display module.

Options to the CRIND include Cash Acceptor, that allows the customer to pay for fuel by inserting cash into the acceptance slot; and the Bar Code Reader option that allows customers to automatically authorize customer price discounts on CRIND device-equipped units using a bar code tag. The CRIND device printer prints customer receipts and in some cases, promotional information.

Single-line CRIND Display T20379

Figure 6-47: Single-line CRIND Display T20379



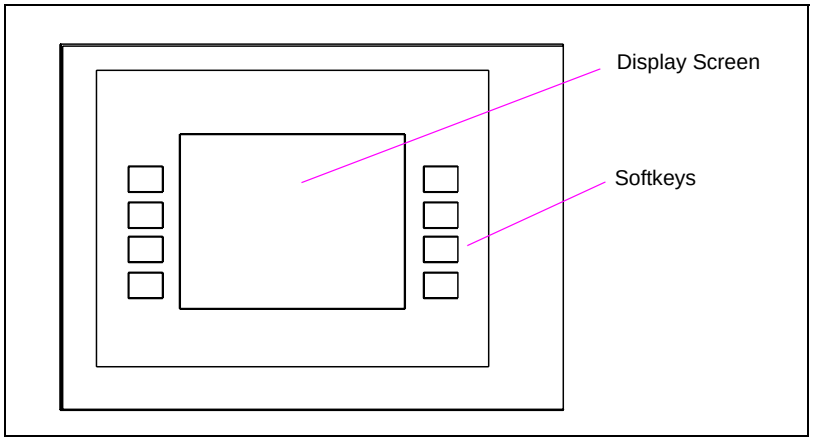
Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P851 (40 pin)	M01668A004	CRIND Regulator PCA M02705 (previously T20306)	P252
P852 (3 pin)		CRIND Logic Z180 PCA T17764	P558

Monochrome Display - E300 and 500

The Monochrome Display screen displays multiline prompts, advertising messages, and static graphics on a monochrome LCD screen. The outside view of the display is the same for Encore 300, Encore 500 and Eclipse.

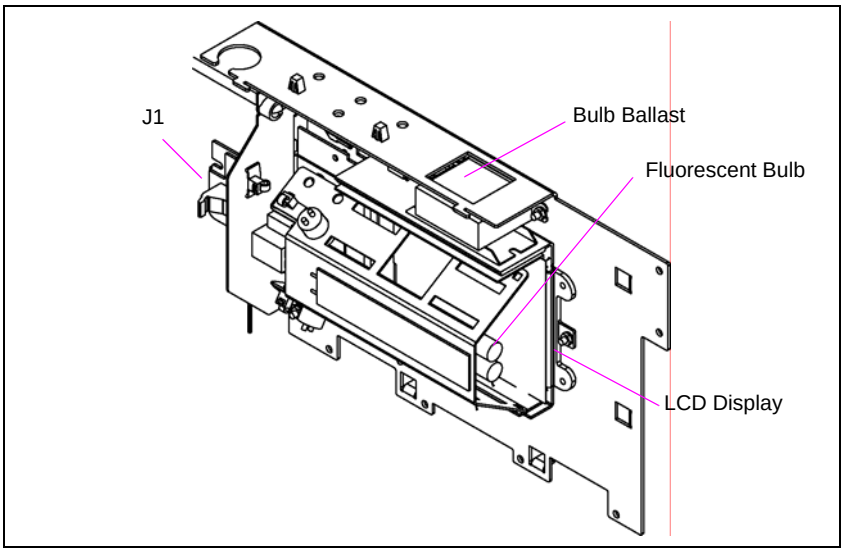
Figure 6-48: Monochrome Glass with Softkeys M00696A001



M00xxxxxxx

Monochrome displays are used in the Encore 300, Encore 500 and Eclipse series units. The Monochrome display assemblies built before July 14, 2001 used replaceable fluorescent backlight bulbs to illuminate the display. M01653A001 uses LEDs that are not replaceable. Contrast adjustments are made using the CRIND Diagnostic card.

Figure 6-49: Monochrome Display Assembly M0xxxxxxx



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
J1 (34 pin)	M01668A002	Monochrome PCA (T1950-G2)	P2015A for Side 1, P2015B for 2ide 2.
J5 (2 pin)		CRIND Regulator PCA (T20304)	P563 for Side 1, P566 for Side 2

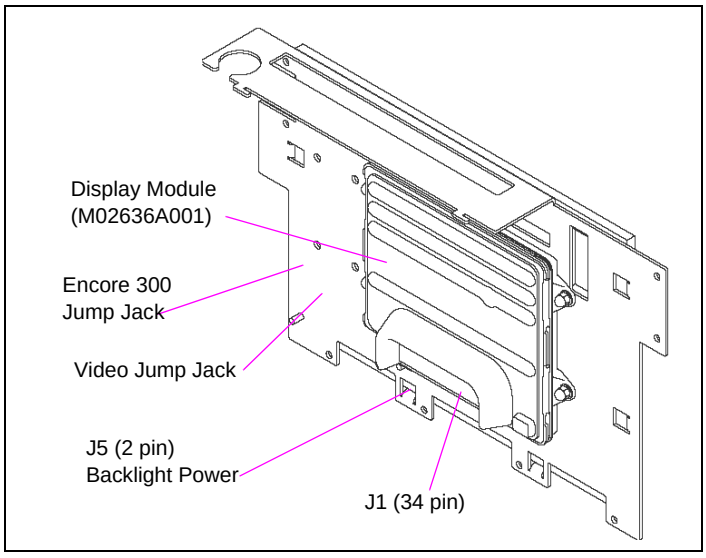
M01653A001 Monochrome Display

The Monochrome Display board displays multiline prompts, advertising messages, and static graphics on a monochrome LCD screen in Encore 300, Encore 500 and Eclipse series units. Earlier version used replaceable fluorescent backlight bulbs to illuminate the display. The LEDs in this assembly are not replaceable. Contrast adjustments are made using the CRIND Diagnostic card.

Service Tips

- Rain shield inside the door is required for assembly.
- Do not remove the plastic shield over the display.
- Order Display Module (M02636A001) for service.

Figure 6-50: Monochrome Display Assembly M01653A001



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
J1 (34 pin)	M00553A001	CRIND Control Node (M01753A001	P1302 for Side 1, P1303 for Side 2
J5 (2 pin)	R02778-G1 to M00517A005	24 V Power Supply PCA (M02774A001)	P3502A

Jump Jacks

Jumper	Setting	Function
J3	A	Normal image
J3	B	Image rotated 180 degrees (inverted)

Connector Pin Functions and Voltages

J1 (34 pin) Data Interface (pin assignment not available)

J5 (2 pin)

Pin #	Description	Input /Output Voltage
1	Backlight power	+24 V Regulated
2	Ground, Backlight power supply	

CRIND Device Card Reader

Production of the Single Head Card Reader was discontinued in January 2002. Use kit M02139K00X to replace. Refer to PT-1936 Encore Illustrated Parts Manual.

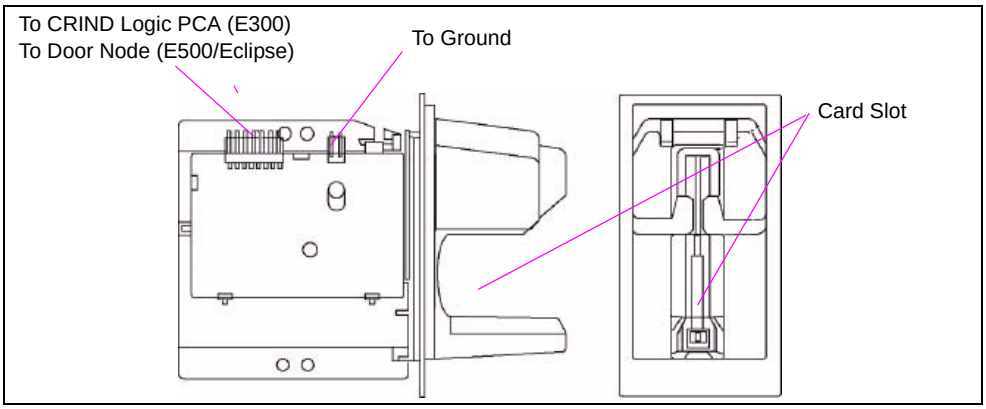
The Dual Head Card Reader option provides two magnetic heads located at the top of the card reader and directly opposite each other. This provides the capability for reading the card from either side, as long as the magnetic strip is facing up.

Encore 300 models that contain a CRIND logic board will require an upgrade to the CRIND BIOS when switching from single to dual head card reader. Contact the Gilbarco Call Center at 1-800-800-7498 for details of the version of CRIND BIOS needed to support the Dual Head Card Reader.

Service Tips

- Card readers must be cleaned periodically (weekly or as needed) using a Cleaning Card (G11482). A dirty reader can result in reading problems. Always attempt to clean reader before deciding to replace it.
- CRIND diagnostics can be used to test card reader performance and determine statistical data useful in card reader service.

Figure 6-51: Dual Head CRIND Card Reader



Board Connections and Cables

Model	Connector#	Via Cable	To Board	At Connector#
E300	(7 pin)	M01555A001	Door Node (M00062A001)	P254 (9 pin)
	CR (6 pin)	M02134A001	GND	ring terminal
E500, Eclipse	(7 pin)	M00501A001	Door Node	P2102 (9pin)
			GND	ring terminal

Cleaning Card Reader Instructions

Use a Gilbarco Cleaning Card (Q11482) to clean the card reader frequently (Gilbarco recommends cleaning the card reader weekly with a new cleaning card). Also, use a cleaning card to clean the card reader if cards are not being read in normal operation. Re-order cleaning cards from your Gilbarco distributor.

Cash Acceptor

The Cash Acceptor option for CRIND card readers accepts bills and extends pay-at-the-pump convenience to cash customers. Each bill inserted and accepted by the CRIND device is recorded in the CRIND log file. The CRIND log file prints the bills accepted at the top of the receipt. Cash Acceptor assembly part number M01271A002 is used in Encore 300 and M01271A004 is used in Encore 500 and Eclipse. In rare cases, a customer may dispute the amount of money they inserted into the Cash Acceptor. Use the G-SITE system records to help settle the dispute or to get Cash Acceptor information beneficial to site management.

CAUTION

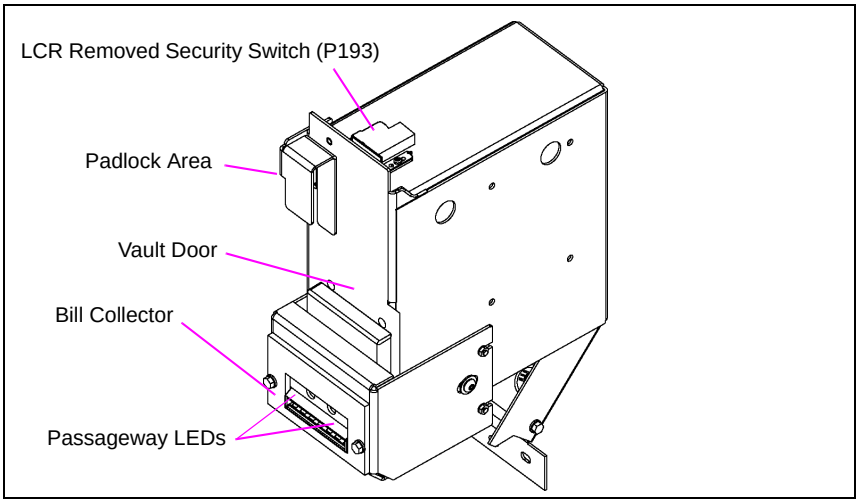
Do not open the electronics cabinet to change paper, to remove Cash Acceptor cassettes, or to perform any other tasks while it is raining. The moisture from the rain can damage the unit.

Service Tips

- Technicians should always request the station manager to empty the cash acceptor cassette prior to servicing the mechanism.
- CRIND Diagnostics can be used to test cash acceptor performance and to determine statistical data.

Cash Acceptor - Encore 300

Figure 6-52: Cash Acceptor Assembly M01271A002

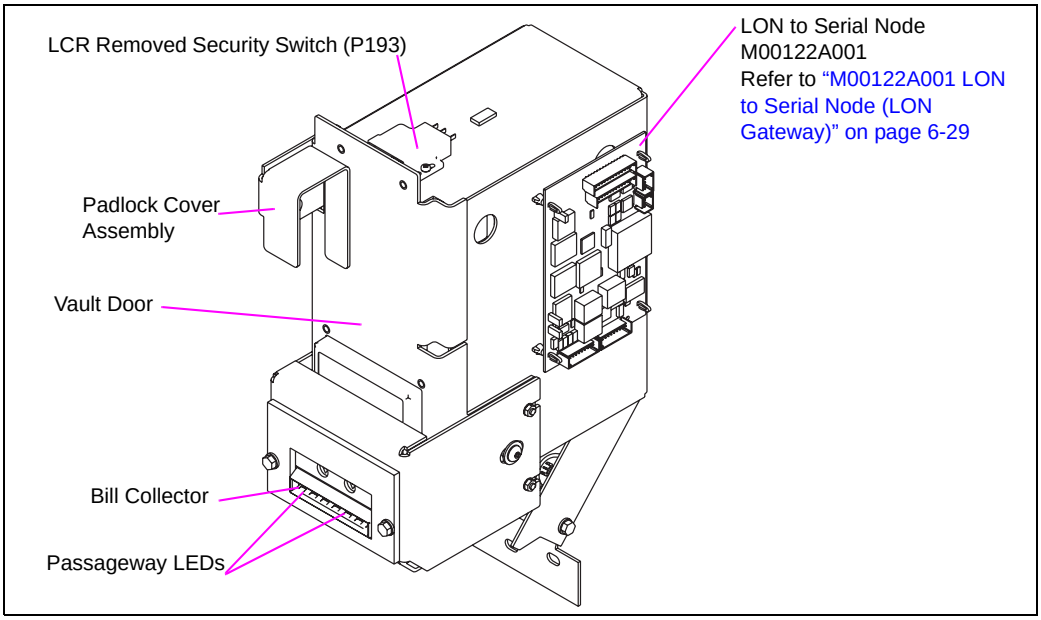


Connections and Cables (E300)

Model	Connector#	Via Cable	To Board	At Connector#
E300	P193 (2 pin)	M02211A001	CRIND Logic PCA (T17764-G3/G4	P269 (10 pin)
	P1 (30 pin)	M02154A001 to M02211A001		
	J115 (2 pin)	M02160A002 to M01650A001	Monochrome PCA (T19501-G2)	P192 (2 pin)
	PWR (3 pin)	M022369A002	Power Supply (M02274A001)	Cash A/B (3 pin)
	Line Filter (2 pin)	M022369A002 to M02154A004	Cable M02211A001	P1991 (4 pin)

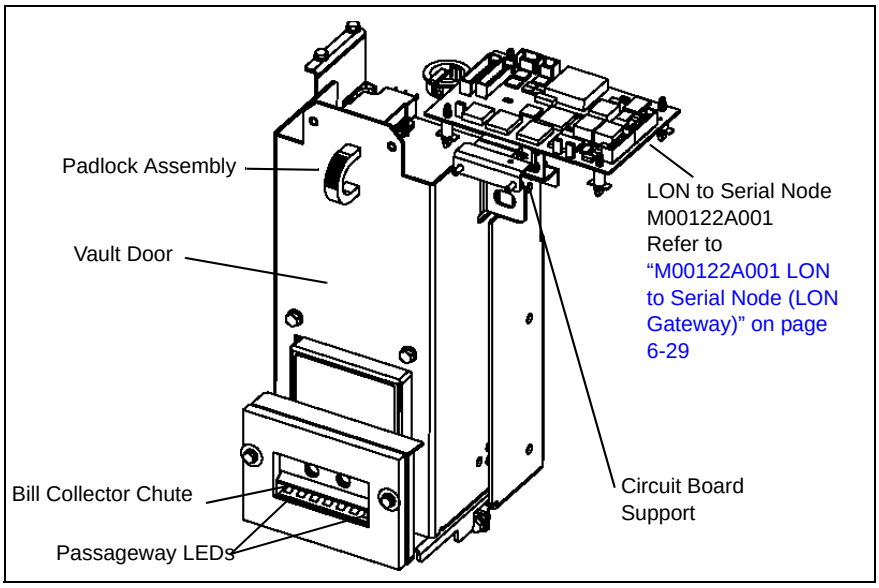
Cash Acceptor - Encore 500

Figure 6-53: Cash Acceptor Assembly (M01271A001)


LCR Removed Security Switch (P193)
LON to Serial Node M00122A001
Refer to "M00122A001 LON to Serial Node (LON Gateway)" on page 6-29
Padlock Cover Assembly
Vault Door
Bill Collector
Passageway LEDs

Cash Acceptor - Eclipse

Figure 6-54: Cash Acceptor Assembly M01403A001


Padlock Assembly
Vault Door
Bill Collector Chute
Passageway LEDs
LON to Serial Node M00122A001 Refer to "M00122A001 LON to Serial Node (LON Gateway)" on page 6-29
Circuit Board Support

Connections and Cables (E500 and Eclipse)

Model	Connector#	Via Cable	To Board	At Connector#
E500, Eclipse	J1 (30 pin)	M02154A001 to MO2153A001	Serial to LON Node (M00122A001)	P1508 (13 pin)
	J115 (2 pin)	M02160A001 to M02152A001		P1510 (5 pin)
	J193 (2 pin)	M02152A001		P193 (2 pin)
	Line Filter	M02154A001 to MO2153A001		P1508 (13 pin)
	PWR (3 pin)	M02367A002	Power supply terminal block	Cash A/B (3 pin)

Cash Acceptor Troubleshooting

Use the following table to troubleshoot Cash Acceptor problems. If you cannot resolve the problem, contact your local service provider.

Problem	Possible Cause	Corrective Action
Cash Acceptor does not operate or stack bills when power is applied.	• Unit is not getting power (no LEDS lit inside passageway at door). • Unit is in calibration mode.	• Check AC power to Cash Acceptor. • Verify all Cash Acceptor switches are off.
Cash Acceptor does not give credit or register accepted bills.	• The Cash Acceptor is in "test/pulse" mode. • The Cash Acceptor is defective.	• Take Cash Acceptor out of test mode. • Replace Cash Acceptor.

Problem	Possible Cause	Corrective Action
Cash Acceptor won't pull in a bill (motor does not start).	• The cassette is not installed. • The cassette is installed incorrectly. • The Cash Acceptor is defective.	• Ensure that the cassette Is properly installed. • Ensure that all locks are installed. • "REMOVE"/"INSTALL" latch must be turned completely to the "INSTALL" position and not beyond on the LRC.
	• The CRIND receipt printer is low on paper or out of paper.	• Ensure that the CRIND receipt printer has paper.
Cash Acceptor has excessive number of bill jams.	• The cassette is installed incorrectly. • There are bill pieces in the Cash Acceptor.	• Ensure that the cassette Is properly installed. • Ensure that all locks are installed. • "REMOVE"/"INSTALL" Latch must be turned completely to the "INSTALL" position and not beyond on the LRC. • Remove any bill pieces in the Cash Acceptor. • If none of the above work, try a different cassette (spare or from another unit). • If this is a recurring problem
Cash Acceptor rejects all bills.	• The Cash Acceptor has had a failure of one or more components. • The Cash Acceptor is not properly programmed.	• Verify all Cash Acceptor switches are correctly set. • Cash Acceptor requires calibration.
"General Fault" displays on G-SITE screen.	The Cash Acceptor is too unstable to continue operation.	Power-fail the dispenser.

CRIND Printer Module

The CRIND printer and the Printer Node in Encore 500 and Eclipse series units is an assembly module with the node portion being connected to the LON bus. The printer node provides power to the thermal printer contained inside the unit and is designed to move information from the LON to the printer and control the printer. There is one jumper on the printer node to determine side 1 or 2. The Encore 500 and Eclipse printer module assembly are interchangeable by relocating the printer node enclosure. The Encore 300 has a printer interface board attached to the printer interface mechanism similar to the Encore 500 and Eclipse. The Encore 300 printer is not interchangeable with the Encore 500 and Eclipse printer.

Service Tips

- Printer and circuit boards are only replaceable as a unit.
- Paper size and type are critical for proper printer operation.
- Paper that does not conform may shorten printer life and cause service problems such as jams and poor print quality. See the following table for recommended suppliers.
- Use Printer Cleaning Card part number Q13400 when print quality is poor.
- Intermittent cable connections can cause printer problems. Ensure that cable connections are secure and tight.
- The anti-static brush bristles under the roller access cover must touch the paper lightly to prevent paper jams.
- Paper jams may occur if the roller access cover is not closed completely.
- Printer chute kits are available for printers manufactured prior to March 2003 that have jamming problems.

Figure 6-55: CRIND Printer Assembly Module - Encore 300

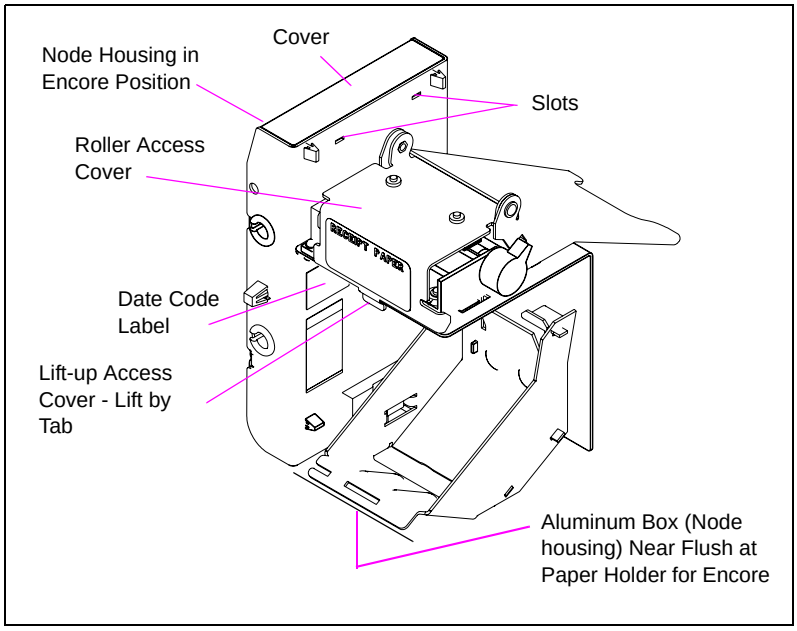

Cover
Node Housing in Encore Position
Slots
Roller Access Cover
Date Code Label
Lift-up Access Cover - Lift by Tab
Aluminum Box (Node housing) Near Flush at Paper Holder for Encore

Figure 6-56: CRIND Printer Assembly Module - Eclipse

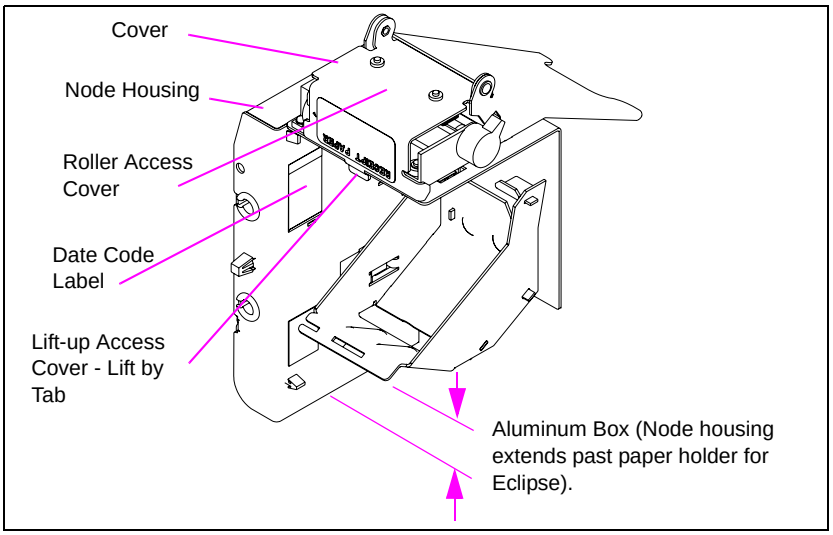
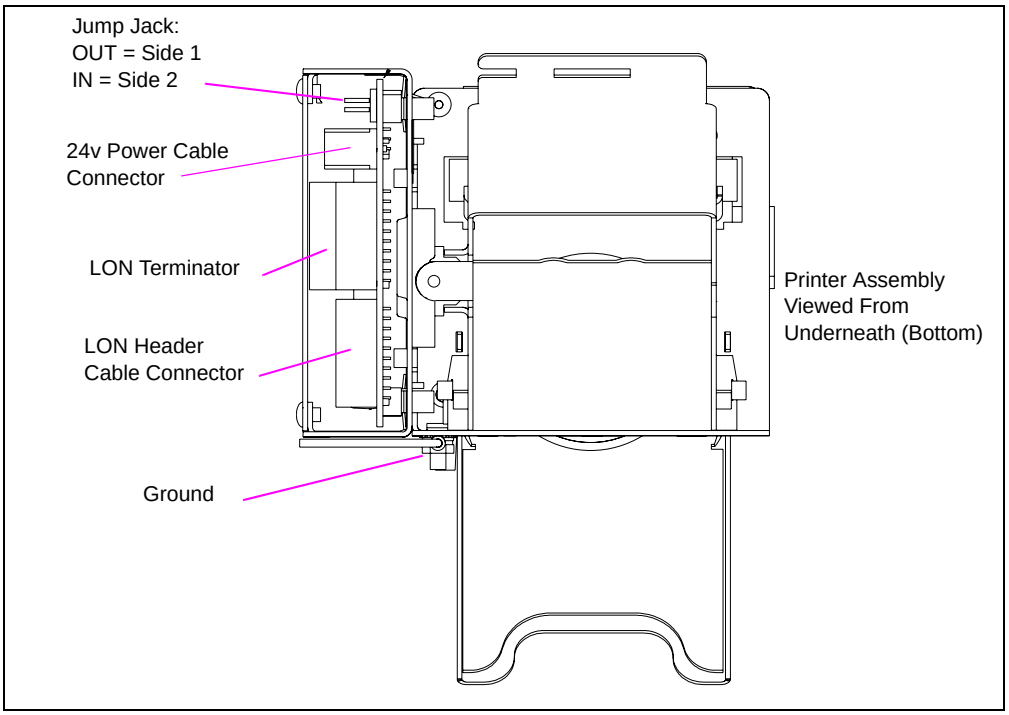

Cover
Node Housing
Roller Access Cover
Date Code Label
Lift-up Access Cover - Lift by Tab
Aluminum Box (Node housing extends past paper holder for Eclipse).

Figure 6-57: Printer LON Board Connections for Encore 500 and Eclipse



Jump Jack Settings

Jump Jack	For This Side	Jumper Setting Is
JP-1	1	OUT
	2	IN

Replacing CRIND Receipt Printer Paper

It is important to keep the CRIND receipt printer supplied with paper. If the CRIND printer is low on paper, or out of paper, the Cash Acceptor will not accept bills.

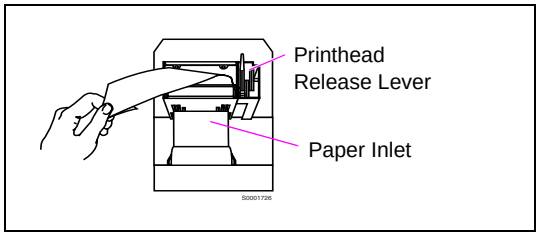
Note: You may encounter different printers. Follow the paper change instructions on the printer.

Replacing the CRIND Receipt Printer Paper

To replace the CRIND receipt printer paper, proceed as follows:

1. Remove paper roll core.
2. Raise roller access cover and actuate printhead release lever.
3. Remove paper from cutter and chute.
4. Feed new paper into paper inlet until paper appears between roller bars.
5. Align and feed paper through printer rollers until paper protrudes slightly past end of chute.
6. Lower printhead release lever.
7. Fully close roller access cover.
8. Confirm proper installation by printing test receipts.
   Note: Certain models will automatically print a test receipt. Otherwise use the diagnostic card to print a test receipt.

Figure 6-58: CRIND Device Receipt Printer



Recommended Suppliers

Supplier	Part Number
Fujitsu	FTP-202PE011-64M
NCR	SLW690
Wallace	1146

Cleaning Printer Instructions

Use printer cleaning cards (Q13400) periodically to clean the printer (Gilbarco recommends cleaning the printer every three months). Cleaning the printer will eliminate most printing quality problems, such as light or faint printing.

To clean the printer, proceed as follows:

1. Raise roller access cover and activate printhead release lever.
2. Remove paper from printer.
3. Insert a printer cleaning card (Q13400) into the printer inlet and into the rollers.
4. Close printhead release lever.
5. Manually advance the cleaning card through the roller bars by moving the gears on the side.
6. Replace the paper roll and re-install receipt paper as described in "Replacing CRIND Receipt Printer Paper" on page 6-109.

Bar Code Scanner

When interfaced with a POS system, the Bar Code Scanner option allows customers to automatically authorize customer price discounts on CRIND device-equipped units using a bar code tag.

Encore 300 uses existing T17764-XX CRIND Z-180 Logic Board. For Encore 500 and Eclipse units, the Scanner is controlled by a LON/serial node per unit side. The Encore 500 and Eclipse Bar Code Scanners use CRIND Basic Input/Output System (BIOS) software version 2.0.30 or greater in order to operate properly. The Encore 300 scanners require CRIND BIOS software version 60.7.20 or greater for generic dispensers, and version 25.2.40 or greater for Major Oil Companies (MOC).

⚠ WARNING

Laser light used in this product and may present an eye hazard during service.
Direct viewing of laser light may damage eyesight.
Avoid long term viewing of direct laser light.

Figure 6-59: Bar Code Scanner Assembly M00969A001

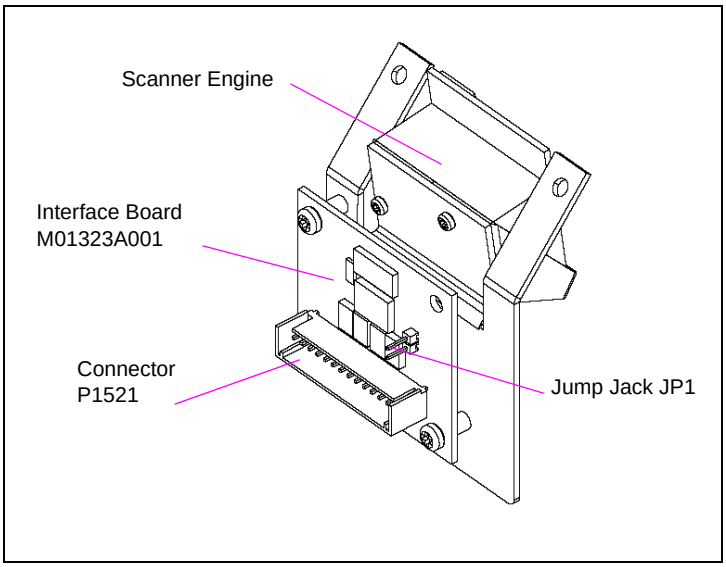


Figure 6-60: Advantage/E300 Block Diagram

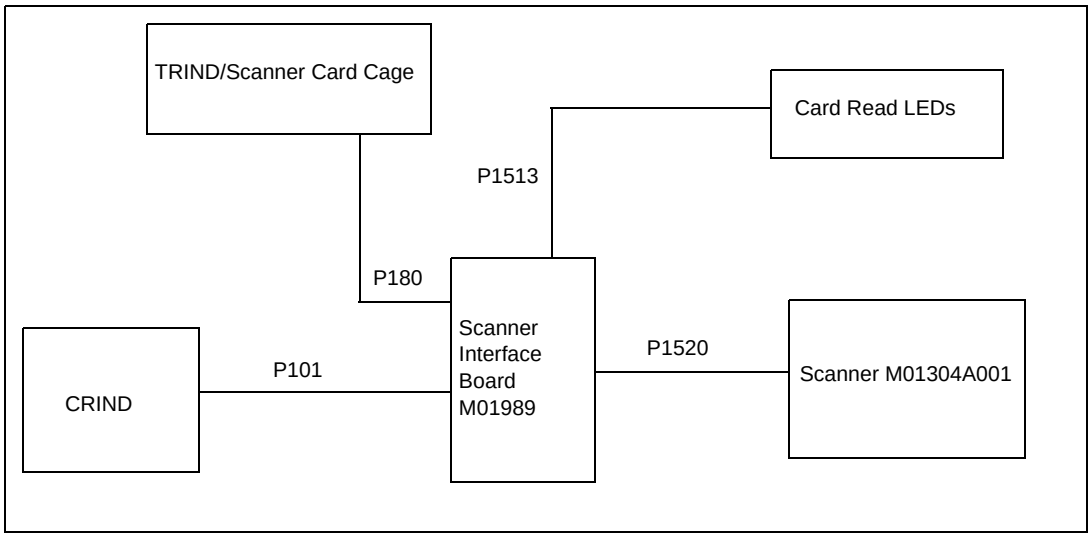
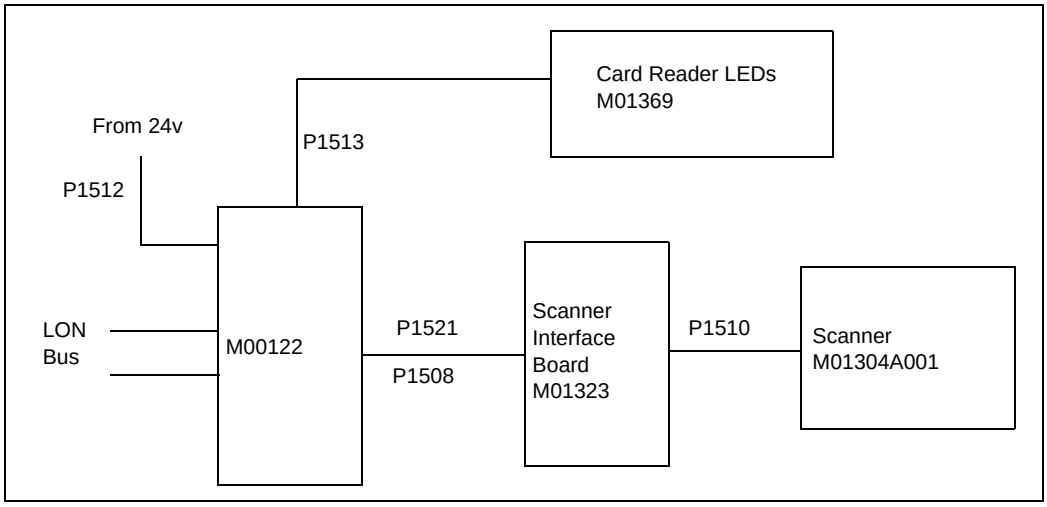


Figure 6-61: E500/Eclipse/E500S Block diagram



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P1521 (14 pin)	P01378A001	Serial to LON Node (M00122A001)	P1509 (14 pin)

Jump Jack Settings

Jump Jack	
JP1	Turns scan laser on for testing (normally not installed)

Junction Boxes

The following table lists the contents in this sub-section.

Topic	Page
Encore Series Junction Box	6-113
Eclipse Series Junction Box	6-114

About Junction Boxes

For Encore units, conduits may run into the electronics cabinet without the use of a junction box. Depending on configuration, the Encore Series dispenser units may ship without a junction box or field conduit. Some retrofit units will require a junction box due to limited wire length available from sub-up conduit; in this case, the installer would have installed a junction box to splice wires. Junction boxes, when installed, are Class 1 Division 1 explosion proof. The junction box is mounted on Side 1 of unit. Eclipse dispensers contain a factory supplied junction box on Side 1. The stub up for this box is located on Side 2 of the unit. Junction boxes must be secured to the dispenser's frame

Junction box retrofit kits are typically installed when existing station wiring is adapted to an Encore unit. Refer to MDE-4084 Junction Box Retrofit Kit Installation Manual for more information. Check conduit routing through the air gap for compliance-no unsealed holes are allowed in the air gap plates. Refer to MDE-3985 Encore Installation Manual and MDE-3986 Eclipse Installation Manual, for specific information on junction boxes.

Encore Series Junction Box

Figure 6-62: Junction Box in Encore Dispenser

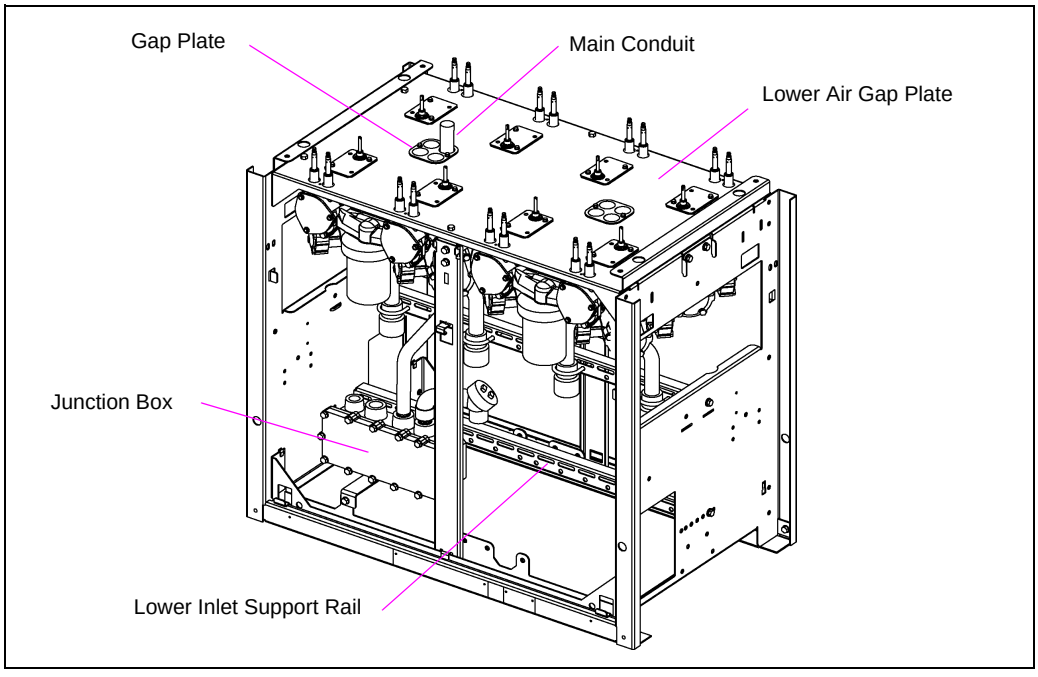
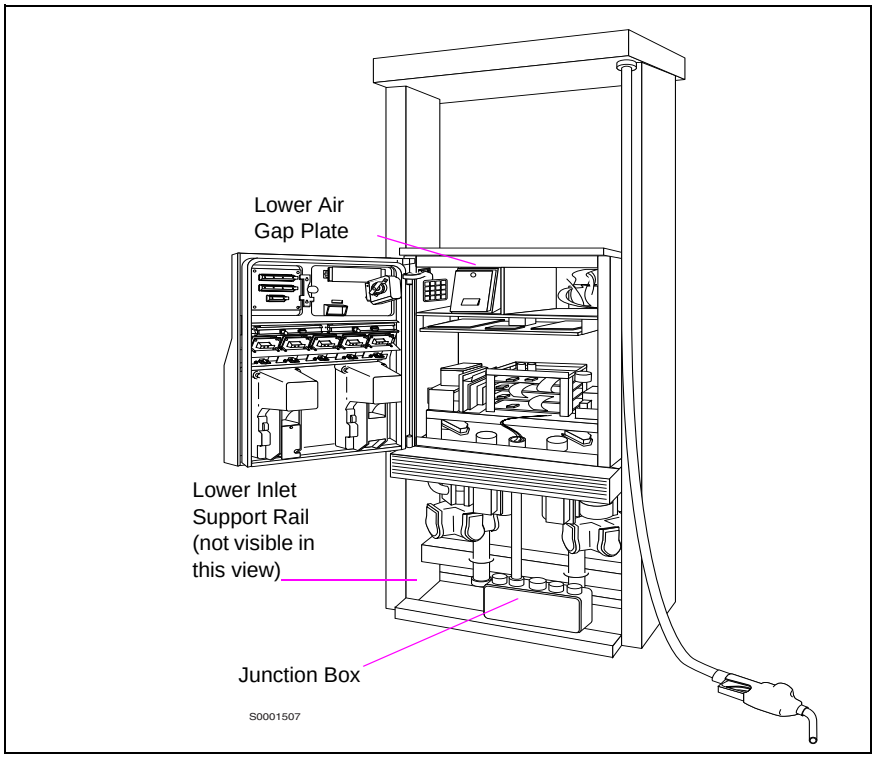
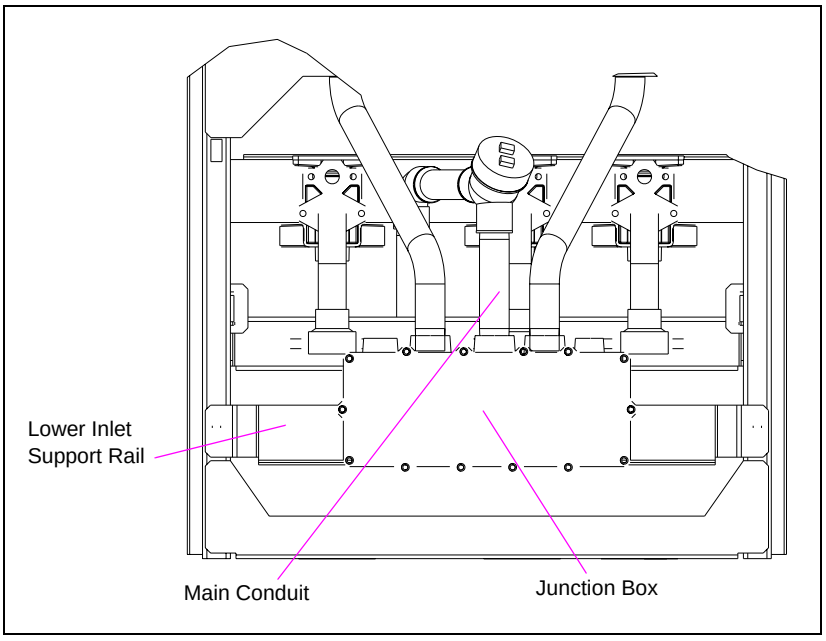


Figure 6-63: Junction Box in Encore pump



Eclipse Series Junction Box

Figure 6-64: Junction Box in Eclipse Dispenser



VaporVac Electrical Components

The following table lists the contents in this sub-section.

Assembly	Topic	Page
PCA	M00080 VaporVac Isolation PCA	6-116
	T18015 VaporVac Valve Driver PCA	6-117
	T18018 VaporVac Motor Drive PCA	6-119
	T19401 VaporVac Controller PCA	6-121
Power Supply	M01775A001 and A002 VaporVac Power Supply for Encore	6-123
	T18162 VaporVac Power Supply for Eclipse	6-124

About VaporVac Electronic Components

The fueling customer places the VaporVac nozzle in the vehicle's fill pipe. The VaporVac Controller uses the pulse signals from the meters to track real-time flow rates and determine the proper vacuum to remove vapors from the vehicle tank. Vapors are returned to the site's fuel storage tank.

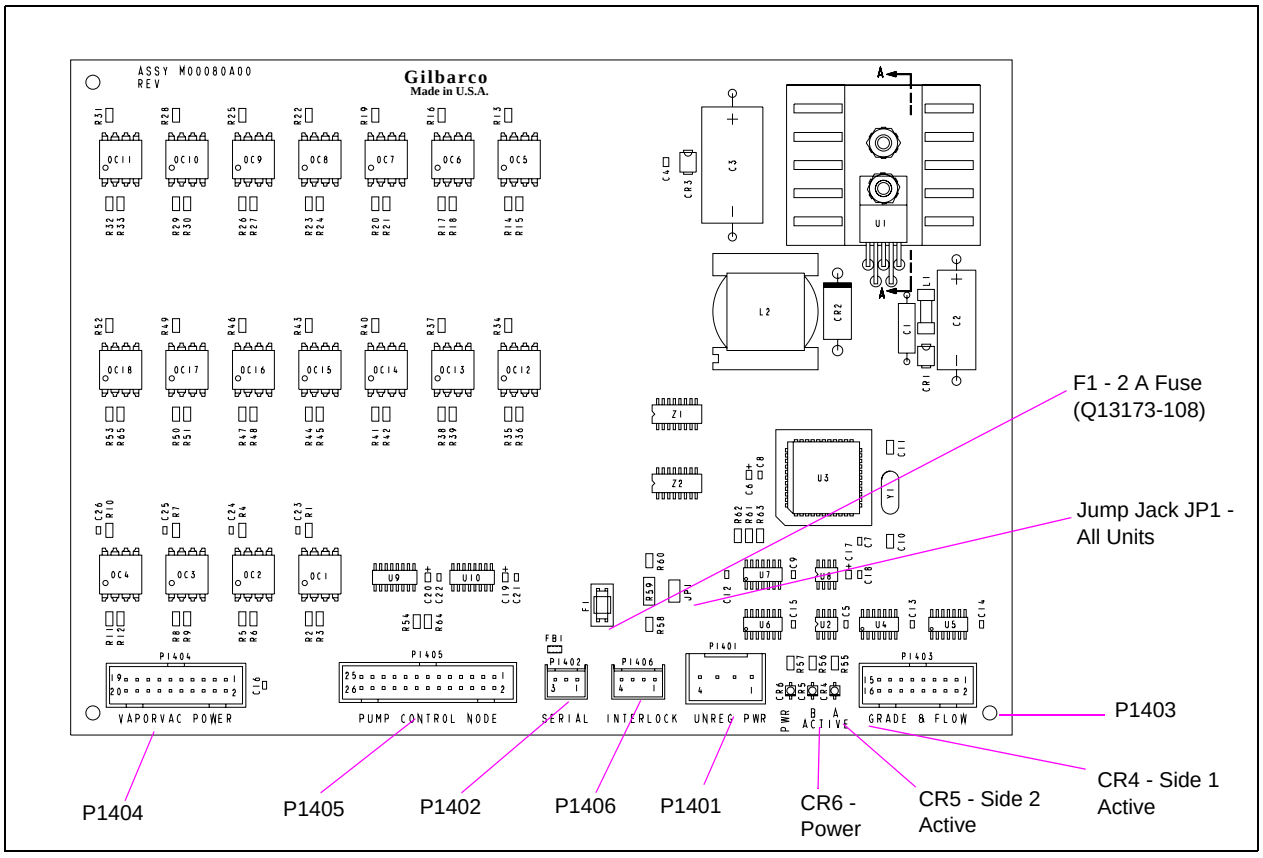
The Printed Circuit Assemblies (PCAs), power supply, and card cage make up the VaporVac Electronics module. The following table lists modules, PCAs, and power supply associated with each.

Model	Voltage	Module No.	PCA No.	Power Supply No.
Eclipse				
Encore 300	115 VAC/60 Hz without vapor valves	M01776A004	• T18018-G1 • T19401-G2	M01775A001
	220 VAC/50 Hz without vapor valves	M01776A006		M01775A002
Encore 500	115 VAC/60Hz without vapor valves	M01776A003	• M00080A001 • T18018-G1 • T19401-G2	M01775A001
	220 VAC/50 Hz without vapor valves	M01776A005		M01775A002

M00080 VaporVac Isolation PCA

The VaporVac Isolation Printed Circuit Board is used to interface the VaporVac system with the pump node.

Figure 6-65: VaporVac Isolation Board



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P1401 (4 pin)	R19672-G1	T18018 VaporVac Motor Drive PCA	P1005 (4 pin)
P1403 (4 pin)	R19665-G1	T19401 VaporVac Controller PCA	P1103 (Interface)
P1404 (20 pin)	R17995-G4		P1104 (20 pin)
P1405 (26 pin)	M00549A002 (Encore) M01036A001 (Eclipse)	M00056A001 Pump Control Node-1	P1110 (26 pin)
P1406 (4 pin)	R19669-G1	T19401 VaporVac Controller PCA	P1106 (Interlock)

LED Indicators

LED	Status/Indicates
CR4	OFF = Side 1 not authorized / ON = Side 1 authorized / Blinking = Side 1 dispensing fuel
CR5	OFF = Side 2 not authorized / ON = Side 2 authorized / Blinking = Side 1 dispensing fuel
CR6	OFF = no power to PCA / ON = power to PCA

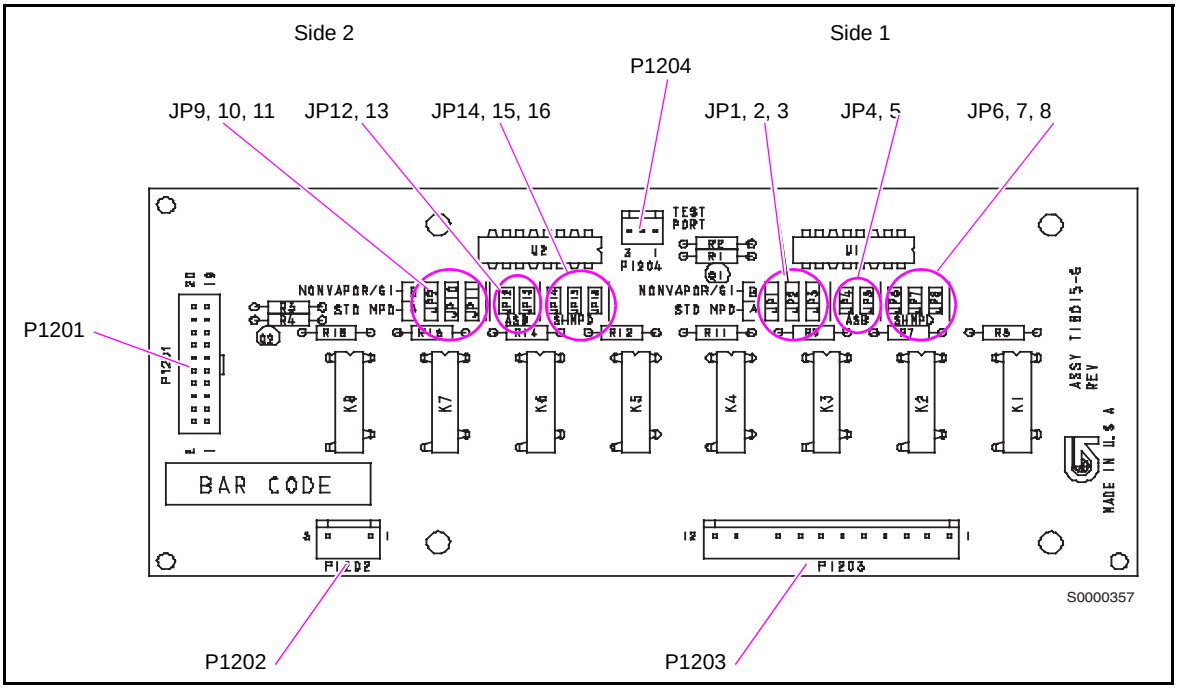
T18015 VaporVac Valve Driver PCA

When used in the Encore 300, Encore 500 and Eclipse, this board receives 12 VDC signals from the T19401 VaporVac Controller PCA and switches 120 VAC to the T17909 Vapor Valves.

Service Tip

Units manufactured after July 2002 do not use solenoid valves on this board.

Figure 6-66: VaporVac Valve Driver Board



Board Connections and Cables

Multi-Hose + 1 Units (Encore Series units only)

Unit Type		Side 1	Side 2
9: 3 Grade, 3 Hose Blender + 1	Non Diesel + 1	N/A	N/A
	Diesel + 1	JP1A, JP2A, JP3A	JP9A, JP10A, JP11A

Connector#	Via Cable	To Board	At Connector#
P1201 (20 pin)	R19666-G1	T19401 VaporVac Controller PCA	P1101 (20 pin)
P1202 (3 pin)		T18162 VaporVac Power Supply Assembly	(3 pin)
P1203 (12 pin)	• Encore:T17928-G2 cable to M00845A001 cable at J/P1030, to M00830A001 cable at J/P2030 to P1 • Eclipse: M00981A001	VaporVac Valves	• Encore: P1 on Valve(s) J11, J12, J13, J21, J22, J23 • Eclipse: J13, J21

Jump Jack Settings

Multi-hose Units (Encore Series units only)

Unit Type	Diesel On Grade (If Applicable)	Side 1	Side 2
2: 2 Grade, 2 Hose MPD	N/A	JP1A, JP2A	JP9A, JP10A
	1	JP2A	JP10A
	2	JP1A	JP9A
3: 3 Grade, 3 Hose MPD	N/A	JP1A, JP2A, JP3A	JP9A, JP10A, JP11A
	1	JP2A, JP3A	JP10A, JP11A
	2	JP1A, JP3A	JP9A, JP11A
	3	JP1A, JP2A	JP9A, JP10A
4: 4 Grade, 4 Hose MPD	N/A	N/A	N/A
	1	JP1B, JP2B, JP3B	JP9B, JP10B, JP11B
	2	JP1A, JP2B, JP3B	JP9A, JP10B, JP11B
	3	JP1A, JP2A, JP3B	JP9A, JP10A, JP11B
	4	JP1A, JP2A, JP3A	JP9A, JP10A, JP11A
8: 3 Grade, 3 Hose Blender	N/A	JP1A, JP2A, JP3A	JP9A, JP10A, JP11A
10: 3 Grade, 3 Hose 1 Meter MPD	N/A	JP1A, JP2A, JP3A	JP9A, JP10A, JP11A

Single Hose Units (Encore and Eclipse Series units)

Unit Type	Side 1	Side 2
1: 1 Grade, 1 Hose MPD 5: 2 Grade, 1 Hose MPD 6: 3 Grade, 1 Hose MPD 11: 3 Grade, 1 Hose 1 Meter MPD 12: 2 Grade, 1 Hose Blender 13: 3 Grade, 1 Hose Blender 14: 4 Grade, 1 Hose Blender 15: 5 Grade, 1 Hose Blender	JP1A	JP9A

Single Hose + 1 Units (Encore and Eclipse Series units)

Unit Type		Side 1	Side 2
7: 3 Grade, 1 Hose + 1 MPD	* Non Diesel + 1	JP1A, JP2A	JP9A, JP10A
16: 2 Grade, 1 Hose Blender + 1 17: 3 Grade, 1 Hose Blender + 1 18: 4 Grade, 1 Hose Blender + 1 19: 5 Grade, 1 Hose Blender + 1	Diesel + 1	JP1A	JP9A

* *Encore Series units only*

Voltage Test Points

Test Point	Voltage
P1202, Pin 3	120 VAC Hot
P1202, Pin 1	120 VAC Neutral

T18018 VaporVac Motor Drive PCA

This board mounts in the electronics cabinet card cage on factory built units. The motor drive board provides high current switching to drive the motors.

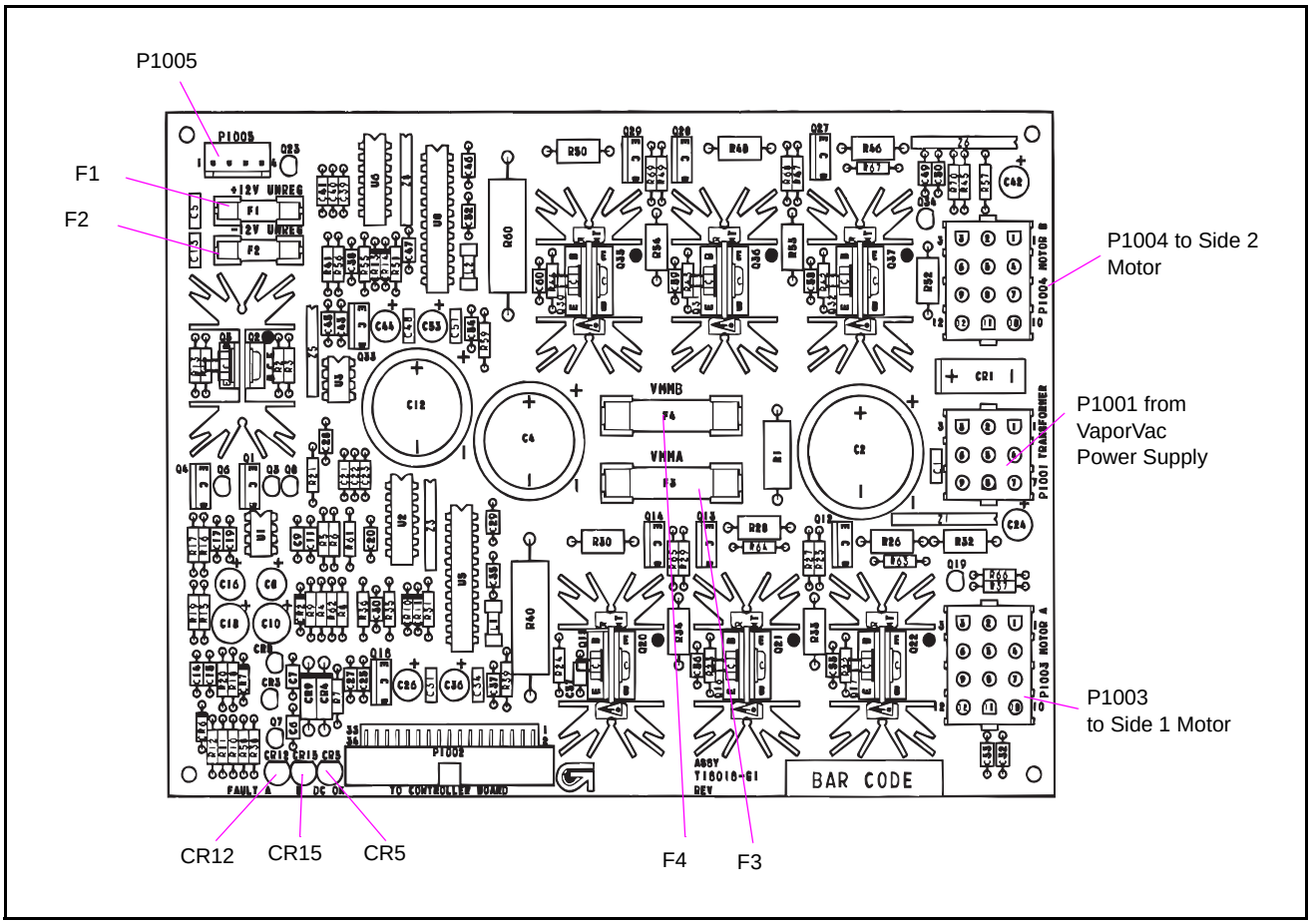
It receives the following voltages:

- +43 VDC and 25.2 VAC from the VaporVac power supply

It supplies the following voltages:

- +/-12 VDC (unregulated) to P1005
- +/-12 VDC (regulated) to the T19401 VaporVac Controller PCA
- 6.2 VDC to the T17942 VaporVac Pump Assemblies (for Hall effect sensors)
- 36-50 VDC (unregulated) to T17942 VaporVac Pump Assemblies

Figure 6-67: VaporVac Motor Drive Board T18018



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P1001 (9 pin)		T18162 VaporVac Power Supply Assembly	
P1002 (34 pin)	R19667-G1	T19401 VaporVac Controller PCA	P1102 (34 pin)
P1003 (12 pin)	• Encore: M00845A001 to M00830A001 (at J2003/P2003) to J3003 • Eclipse: M00980A001	T17942 VaporVac Pump Assemblies (Motor) Side 1	• Encore: J3003 • Eclipse: J11
P1004 (12 pin)	• Encore: M00845A001 to M00830A001 (at J2004/P2004) to J3004 • Eclipse: M00980A001	T17942 VaporVac Pump Assemblies (Motor) Side 2	• Encore: J3004 • Eclipse: J21
P1005 (4 pin)	R19672-G1	M00080 VaporVac Isolation PCA	P1401 (4 pin)

LED Indicators

LED	Indicates
CR12 Fault A CR15 Fault B	ON = vacuum pump motors are off and fuel is not flowing. If LED is on or flickering with fuel flowing, look for problems in VaporVac pump/motor, motor drive board, or related wiring.
CR5 DC OK	ON = normal operation (±12 VDC for VaporVac controller board). If LED is off, look for problems in VaporVac motor drive board, controller board, or power supply.

Voltage Test Points

Test Point	Voltage
P1001, pins 3 and 6	43 VDC
P1001, pins 8 and 9	43 VDC return
P1001, pins 1 and 2	25.2 VAC
P1001, pin 4	GND
P1001, pin 7	0 VAC
P1005, pin 1	12 VDC (unregulated out)
P1005, pin 2	GND
P1005, pin 4	-12 VDC (unregulated out)

Fuses

Fuse	Rating
F1	2 A, 250 VAC Slo-Blo, (+12 VDC)
F2	2 A, 250 VAC Slo-Blo, (-12 VDC)
F3	15 A, 32 VAC, (for motor voltage A)
F4	15 A, 32 VAC, (for motor voltage B)

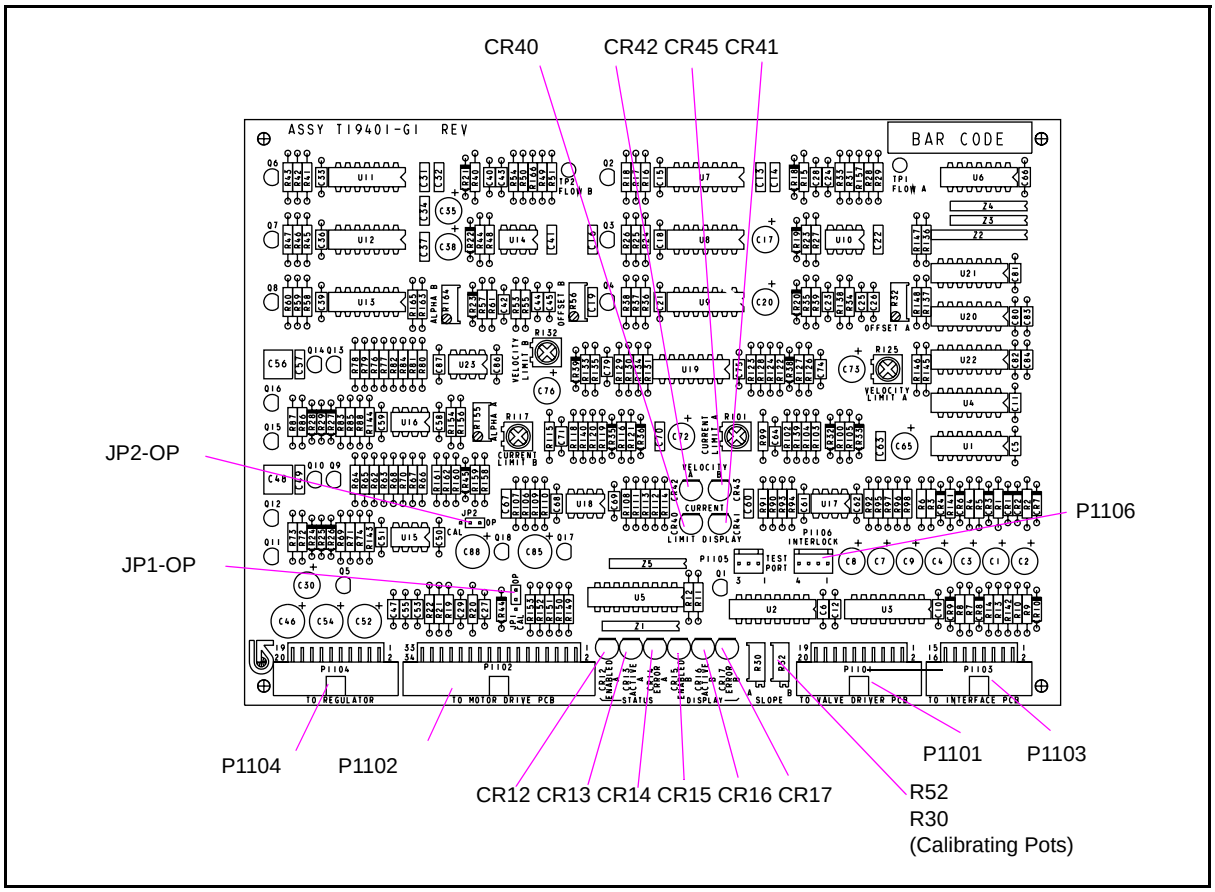
T19401 VaporVac Controller PCA

Board controls the VaporVac system, providing error checking for system status and controls.

It receives the following voltages:

- 5 VDC from the M00080 VaporVac Isolation PCA
- +/-12 VDC from the T18018 VaporVac Motor Drive PCA

Figure 6-68: VaporVac Controller Board



Board Connections and Cables

Connector#	Via Cable	To Board	At Connector#
P1101 (20 pin)	R19666-G1	T18015 VaporVac Valve Driver PCA	P1201
P1102 (34 pin)	R19667-G1	T18018 VaporVac Motor Drive PCA	P1002
P1103 (16 pin)	R19665-G1	M00080 VaporVac Isolation PCA	P1403 (4 pin)
P1104 (20 pin)	R17995-G4		P1404
P1106	R19699-G1		P1406

Jump Jack Settings

JP-1 and JP-2 are always in the ON position.

LED Indicators

LED	Indicates
CR12 ENABLED (side A) CR15 ENABLED (side B)	ON = normal operation. Monitors T19401 VaporVac Controller PCA activation and fuel flow via pulser activity. If LED is off and pulser activates, check for problems in VaporVac controller, M00080 VaporVac Isolation PCA, or hydraulic interface boards or cabling.
CR13 ACTIVE (side A) CR16 ACTIVE (side B)	ON = normal operation. Monitors T17942 VaporVac Pump Assemblies motor rotation. If LED is off and fuel flowing, check for problems in VaporVac pump/motor, VaporVac motor drive, or VaporVac controller boards or cabling.
CR14 ERROR (side A) CR17 ERROR (side B)	OFF = normal operation. Monitors errors in the system. If LED is on, check for problems in VaporVac pump/motor, VaporVac motor drive, or VaporVac controller boards or cabling.
CR40 (side A) CR41 (side B)	Brief flicker when motor changes speed = normal operation. Monitors excessive VaporVac motor current draw. If LED is on, check for problems in VaporVac pump/motor, VaporVac motor drive, or VaporVac controller boards or cabling.
CR 42 (side A) CR 43 (side B)	ON = suspect unrestricted air purging. Look for problems in VaporVac pump/motor, VaporVac motor drive, or VaporVac controller boards or cabling.

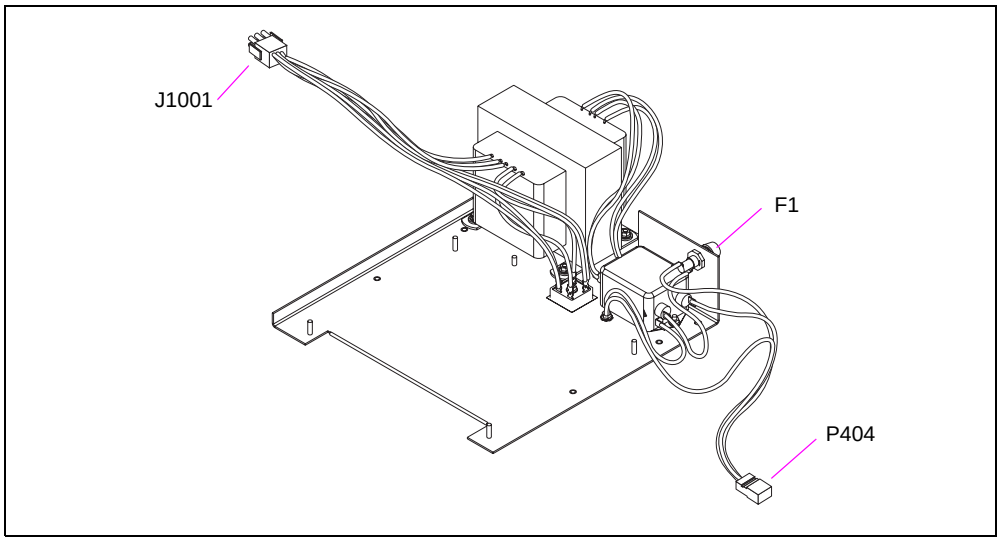
VaporVac Power Supplies

The VaporVac power supply is part of the VaporVac electronics module and provides power to the VaporVac PCAs.

M01775A001 and A002 VaporVac Power Supply for Encore

This power supply is part of the VaporVac electronics module.

Figure 6-69: VaporVac Power Supply M01775A001



Connections and Cables

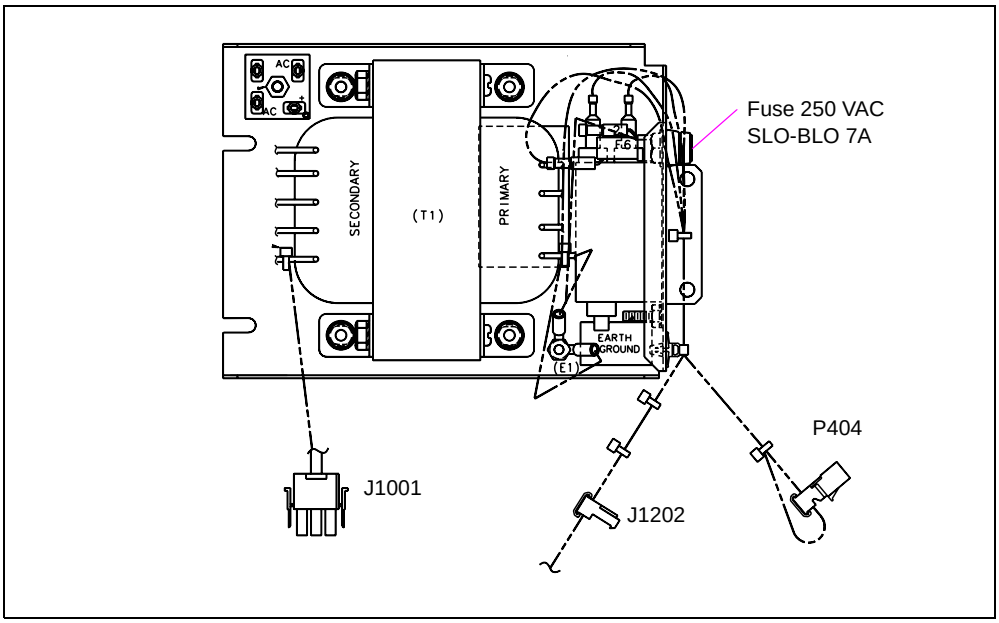
Connector#	Via Cable	To Board	At Connector#
J1001 (9 pin)	Power supply lead	VaporVac Motor Drive PCA T18018-G1	P1001 (9 pin)
P404 (3 pin)	M02710A002	Main power supply	J404 (3 pin)

Fuse

Part	Description
F1	Fuse 250 VAC SLO-BLO 7A

T18162 VaporVac Power Supply for Eclipse

Figure 6-70: VaporVac Power Supply T18162-G3



Connections and Cables

Connector#	Via Cable	To Board	At Connector#
J1001 (9 pin)	Power supply lead	VaporVac Motor Drive PCA T18018-G1	P1001 (9 pin)
J1202 (3 pin)		VaporVac Valve Driver PCA T18015	P1202 (3 pin)
P404 (3 pin)	M02948A001	Main power supply	J404 (3 pin)

Fuse

Part	Description
F1	Fuse 250 VAC SLO-BLO 7A

7 – Hydraulic/Mechanical Components

About this Section

Important Information about Releases

Sections of this manual may be released independently of each other to supply the most current data. Information about release date and version for independently released sections will be included in the section title and footer of the document. Refer to the Gilbarco Online document resource "GOLD" for the latest update.

This section was last updated in August 2007.

Topics in this Section

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Measuring Pressure and Vacuum	7-12
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Section Overview

This section supplies information on the hydraulic systems and fuel-handling mechanical components contained within the Encore and Eclipse units. This information includes specific safety information, typical measuring procedures, information on related components and common service procedures.

How to Use this Section

Refer to the "Topics in this Section" on page 7-1 for a listing of topics contained in this section with its location. At those locations are tables that list individual components. Use this list to find information on a specific component. Additionally, the index and table of contents can be used to locate information.

Abbreviations and Acronyms

Term	Description
ATC	Automatic Temperature Control
GDP	Global Dispenser Pump (Blackmer® unit)
ISD	In Store Diagnostics
PCV	Proportional Control Valve
STP	Submerged Turbine Pump
TLS	Tank Level Sensor
UST	Underground Storage Tank

Terms Used in this Section

Term	Definition
Dispenser	Fixture from which product is supplied under pressure from STP or aboveground pump
Dispensing Device	Refers to both Dispenser and Pump
Metric Fasteners	Fastener design is based on millimeter measuring system
Pump	Unit contains motor and pumping device to draw product from storage tank (also known as a self contained unit)
SAE Fasteners	Fastener design is based on inch measuring system

General Service Procedures

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Working on Hydraulic Components

Dispensing devices pressurize fuels from the Underground Storage Tank (UST) by way of Submerged Turbine Pump (STPs) for dispensers, or by pressurizing fuel within the unit in the case of self-contained pumps. A potential hazard of fluid spray or leaks exists when working on the hydraulic system, especially if under pressure. Ensure that proper procedures are followed and necessary precautions taken. Refer to "About Servicing Hydraulic Components" on page 7-4 for additional information.

⚠ WARNING

You are working in a potentially dangerous environment of flammable fuels/vapors and high voltage.

Fuel and its vapors may ignite, leading to serious injury or death. Fire, explosion or electrical shock could result in severe injury or death if you do not follow safe procedures.

Surfaces of Eclipse Series units are non-metallic. In any situation where power is on and gasoline and its vapors are present or potentially present (for example, calibration), do not attempt to use the Manager Keypad with electronics cabinet open.

When calibrating Eclipse series units, run keypad cable over door and close door, allowing keypad to be suspended on unit and accessed from outside, for all procedures done with power applied or in presence of fuel or fuel vapor.

⚠ WARNING

Some residual pressure may be present in unit after releasing pressure through the nozzle, resulting in fuel spray.

Always wear proper eye protection when servicing the hydraulic system. Take appropriate steps to contain any spraying or draining fuel.

⚠ WARNING

Static electricity may be present before or during dispensing of fuel. A spark between container and nozzle may occur.
Fire or explosion may result causing serious injury or death.

Ground the nozzle and prover can to prevent static discharge. Do not place prover cans on ungrounded surfaces such as plastic truck liners.

About Servicing Hydraulic Components

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section, and related sections. Use OSHA Lock-out and Tag-out procedures.

Before Beginning

1. Ensure that the unit is not pressurized with fuel. For dispensers, close and test shear valves. Refer to "Shear Valves" on page 7-66 for details.
2. Isolate the unit at the distribution box.
3. Turn off power to the unit. In case of dispensers, remove power from involved STPs. Use OSHA Lock-out/Tag-out procedure at the station's breakers.
4. Open nozzle into approved container to bleed pressure. Some residual pressure may remain.
5. Continue with required service procedures.

After Repairing

1. Restore power to the unit. In the distribution box, place unit in normal operation.
2. Purge air and check for leaks after replacements or rebuilds. Refer to "Purging Air from the System" on page 7-7 for details.
3. Verify proper unit operation.

Servicing Seals, O-Rings and Gaskets

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section, and related sections. Use OSHA Lock-out and Tag-out procedures.
When opening or disassembling hydraulic components that have been in service for more than two years, you should replace the disturbed seals. Failure to replace degenerated or old seals could result in subsequent leakage.

Note: Use of Universal Seal Kits, that contain proportional quantities of material types commonly replaced during service is recommended.

1. Inspect leaking seals for excessive swelling, hardening, softening and other degradation.
2. Clean and inspect sealing surfaces before replacing/installing seals, O-Rings or gaskets.
   Note: Always use Gilbarco-approved O-Rings and gaskets.
3. Replace parts as needed.
4. Use a small amount of silicone grease to retain O-Ring seals in position during assembly, and to improve durability of dynamic seals.

Pipes and Hydraulic Plumbing

Read and follow all safety precautions as outlined in the "Read this First" on page 1-1, in this section and related sections of this manual. Use OSHA Tag-out and Lock-out procedures.

To work on piping, proceed as follows:

- Only use UL-approved pipe sealants, suitable for the fuels involved, for pipe threads, as required. Follow sealant manufacturer recommendations for use.
  Note: Avoid any sealants that will become hard over time.
- Do not tighten or disturb joints where sealant has set.
- Always clean and inspect pipe threads before applying sealant. Do not apply sealant to dirty, oily or wetted threads. Do not apply sealant to the first two threads.
- Do not use Teflon tape (fragments will cause pump failure). Excessive tightening may fracture component during installation or assembly or tape.
- Do not excessively torque fittings. Refer to "Torque Specifications" on page 7-5 for details.
- Always check for leaks after service.

Torque Specifications

Ensure that you follow these recommendations when working with fasteners on pumps and dispensers:

- Never use a metric fastener in place of an SAE (or non-metric) fastener or an SAE fastener in place of a metric fastener. This may lead to damage to the device.
- Always use same grade or higher materials for load bearing devices; for example, for lifting brackets and bolts, else, there is a possibility of failure.
  Note: Use of Universal Bolt and Fastener Kits, that contain commonly replaced bolts during service is recommended.

The following tables provide general torque guidelines for plated steel screws and bolts, pipe plugs, and tube fittings.

Screws and Bolts (Plated)

	Recommended Torque	
Thread	**in-lbs**	**Nm**
M4	10-12	1.1-1.3
M5	25-35	2.8-4.0
M6	36-40	4.1-4.5
M8	120-140	13.6-15.8
M10	150-170	16.9-19.2

Pipe and Tube Fittings

	Recommended Torque	
Thread	**in-lbs**	**Nm**
1/8inch NPT	10-12	13.6-16.3
1/4 inch NPT	22-25	29.8-33.9
3/8 inch NPT	30-35	40.7-47.5

	Recommended Torque	
Thread	**in-lbs**	**Nm**
1/2 inch NPT	35-40	47.5-54.2
3/4 inch NPT	45-55	61.0-74.5
1-inch NPT	70-80	94.9-108.4
1-1/2 inch NPT	150-180	203-244

Flanged and Compression Tube Fittings

	Recommended Torque	
Pipe	**in-lbs**	**ft-lbs.**
1/8 inch	40 - 45	-
1/16 inch	49 - 55	-
1/4 inch	58 - 65	-
5/16 inch	72 - 80	-
3/8 inch	-	9 - 10
1/2 inch	-	19 - 21
5/8 inch	-	26 - 29
3/4 inch	-	38 - 42
7/8 inch	-	49 - 54

Self-Contained Pumping Units

	Recommended Torque	
Unit	**in-lbs**	**Nm**
Pump head (tightened in star pattern)	200	23
Strainer Cover	150	17
Rear Cover	200	23

Meter Bolts

		Recommended Torque	
Bolt (In Order)		**in-lbs**	**Kg-meters**
1	Cylinder cover gasket	130 ± 10	1.50 ± 0.12
2	Piston and connecting bar	35 ± 5	0.40 ± 0.06
3	Shaft seal cap	25 ± 5	0.30 ± 0.06
4	Lower bearing housing	75 ± 10	0.90 ± 0.12
5	Packing retainer	20 ± 5	0.25 ± 0.06
6	Body cover	130 ± 10	1.50 ± 0.12

Purging Air from the System

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Topics in this Sub-section

Topic	Page
About Purging System	7-7
Purging Product Lines (Dispenser)	7-7
Purging Pumps and Dispensers (with fuel in product lines)	7-9

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing parts and fittings.

Fire and explosion could result in severe injury or death.

- Wear eye protection.
- Remove parts and fittings slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

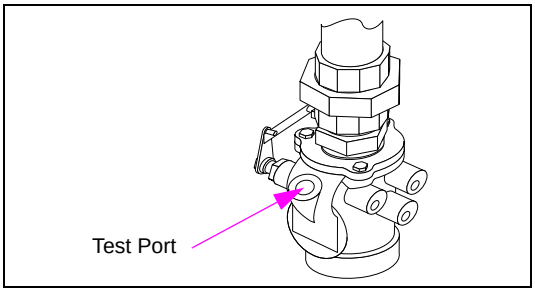
About Purging System

Properly purging air from the hydraulic system is an important service step. Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section, and in related sections. Use OSHA Lock-out and Tag-out procedures. Failure to properly purge air from the system can damage components and result in inaccurate calibration and fuel delivery. Purge air from the system for new installations or whenever fluid containing parts of the hydraulic system are serviced.

Purging Product Lines (Dispenser)

In any situation where air may have accumulated or been introduced into the product lines of the dispensers, it must be purged before purging the dispenser. Using the appropriate connections and with a hose connected to the shear valve test port, purge the product lines until a steady stream of fuel is observed. Check for leaks as you move toward the tank. Close shear valve test port with the appropriate plug and move on to purging air from the unit.

Figure 7-1: Typical Shear Valve and Test Port



To purge product lines, proceed as follows:

1. Turn off all power to STPs involved.
2. Start with the unit farthest from tank.
3. Use a UL-approved sealant to connect a “gasoline suitable, conductive hose” with a mechanical valve (petcock) to shear valve test port. Leave valve closed.
4. Place end of hose into an approved container.
5. Restore power to STPs. Activate STP for the line being purged.
6. Slowly open the mechanical valve until you obtain a slow, constant stream of fuel.
7. Close the mechanical valve and the shear valve, and remove power from STPs.
8. Remove hose from test port.
9. Reinstall and tighten plug removed earlier from test port.
10. Open shear valve and apply power.
11. Check for leaks.

Purging Pumps and Dispensers (with fuel in product lines)

Using Nozzle to Purge Unit

Use the following procedures for units that have had their product lines purged of air. Encore 300, Encore 500 and Eclipse require different procedures to purge the units. Begin purging by partially opening the nozzle until fuel is observed at nozzle, after which you can open the nozzle further to finish purging. For Blender nozzles, select a blend grade. Ensure that prices are set before you begin. Refer to the following information for specific steps for your unit.

CAUTION

Purging through a fully open nozzle on a unit with air in the product lines can damage the meter as a result of overspeed.

Note: Damage resulting from overspeed is not covered by warranty.

Amount to Purge at Nozzle

Use the table below to determine how much fuel to dispense when purging unit through the nozzle.

For	Pump This Amount
Start-ups (installing new systems)	35 gallons (130 liters) per hose
System with fully purged product lines	25 gallons (130 liters) per hose
Major services (changing meters, pumping units, and so on)	25 gallons (90 liters) per hose
Minor services (changing filters, strainers, and so on)	10 gallons (40 liters) per hose

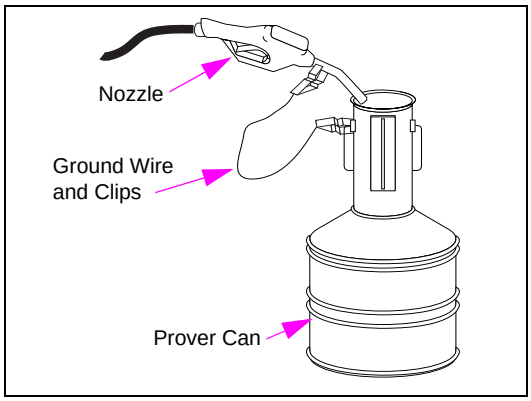
Encore 500 and Eclipse

Units manufactured after December 1, 2002 require no special programming to purge units. Prior to this date, use Encore 300 procedures.

To purge the dispenser, proceed as follows:

1. Lift nozzle handle for hose being purged.
2. Place nozzle in approved container (see Figure 7-2 on page 7-10).
3. Slowly open nozzle until a constant stream of fuel is observed. You may now open the nozzle wider to dispense the proper amount.

Figure 7-2: Dispensing into Prover Can (Purge)



4 Return the nozzle to the nozzle boot.

5 Empty approved container into appropriate product tank.

Encore 300 Units

The Encore 300 will display error code 26 if you attempt to purge air from an un-calibrated unit. To purge an Encore 300, you will need to perform an electronic calibration procedure, where the calibration factor will not be stored into memory. Before proceeding with the steps below, a system configuration (Command Code 10, Function Code 1) must be entered, if the unit is not a blender. Also, a Conversion factor (Command Code 17) must be programmed into the unit or this procedure will not work. Refer to MDE 4039 Encore 300 Programming Quick Reference Card (shipped with all units) for a summary of steps.

1 Open the side 1 CIM door (side with serial plate) by using the C751 key.

2 Flip up the Weights and Measures toggle switch located near the center of the cabinet.

3 Using the manager's keypad inside the cabinet, press **F1** and then **Enter**.

4 Press **90** for side 1 (A) or **91** for side 2 (B), and then **Enter**.

5 Press **5**, then **Enter**.

6 Remove the nozzle and raise the pure product lever or select the pure product grade.

7 Purge air by dispensing 35 gallons for the new system (where air has been previously purged up to the dispenser) or 20 gallons when replacing an existing dispenser.

8 Upon completion of purging, turn off the Weights and Measures switch.

9 Press **F2**.

10 If you have more nozzles/grades on that side or the other to purge, repeat steps 3 through 9.
Note: The purged amount will not be reflected in the electronic totals.

Measuring Flow Rates

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section, and related sections. Use OSHA Lock-out and Tag-out procedures.

⚠ WARNING

Static electricity may be present before or during dispensing of fuel. A spark between container and nozzle may occur.
Fire or explosion may result causing serious injury or death.
Ground nozzle to proven can to prevent static discharge. Place prover can directly on ground and not on any insulated surface.

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing parts and fittings.

Fire and explosion could result in severe injury or death.

- Wear eye protection.
- Remove parts and fittings slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

Dispense fuel into a container and ensure that proper equipment and procedures are being used to eliminate the hazard of fuel vapors igniting as a result of static discharge or other sources. Touch nozzle to prover can or use a grounding clip while dispensing fuel. Return dispensed fuel to the proper storage tank.
Use the appropriately sized prover can.

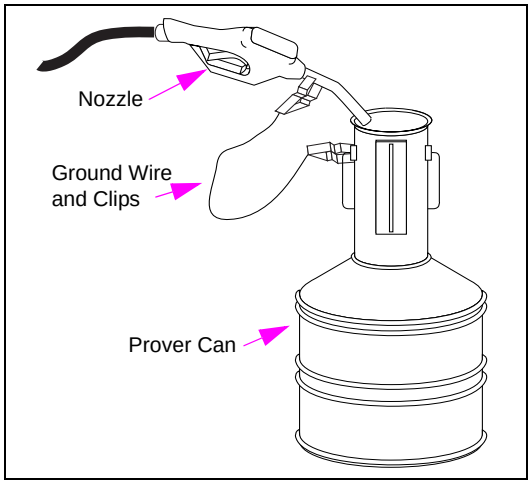
- For standard flow units, use at least a 5 gallon prover can.
- For high gallonage units, use at least a 25 gallon prover can.
- Start with displays reading 0 (zero).

To measure flow rates, proceed as follows:

1 Dispense fuel for 15 seconds (1/4 of a minute) into an approved container. Stop fuel flow. Clean up any spills promptly.

2 To calculate gallons/liters per minute, multiply volume amount by four (For example: 5 gallons x 4 = 20 gallons per minute).

Figure 7-3: Dispensing into Prover Can



Measuring Pressure and Vacuum

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section, and related sections of this manual. Use OSHA Lock-out and Tag-out procedures.

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing parts.

Fire and explosion could result in sever injury or death.

- Wear eye protection.
- Test and close the involved shear valves.
- Turn off power to unit.
- Remove parts slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

Topics in this Sub-section

Topic	Page
Using Pressure Gauge	7-13
Pressure Measuring Locations on Unit	7-13
Measuring Pressure Drop for Dispensers and Pumps	7-15

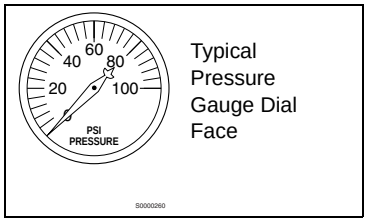
Using Pressure Gauge

Use pressure gauges and vacuum gauges to test pumps and dispensers when:

- Flow rates are too low
- Motors fail prematurely or stall
- Units take a long time to prime
- Units are noisy

Use of a combined vacuum and pressure gauge eliminates the need to calibrate more than one gauge.

Figure 7-4: Typical Pressure Gauge Dial



Ensure that you:

- Always use accurate calibrated gauges (using gauge snubber or dampened gauge will help to prevent gauge damage and obtain more accurate readings).
- Use gauges that have the appropriate scales for reading in pounds per square inch (scale 0-100 PSI) for pressure and 0-30 Hg (inches of mercury) for vacuum.

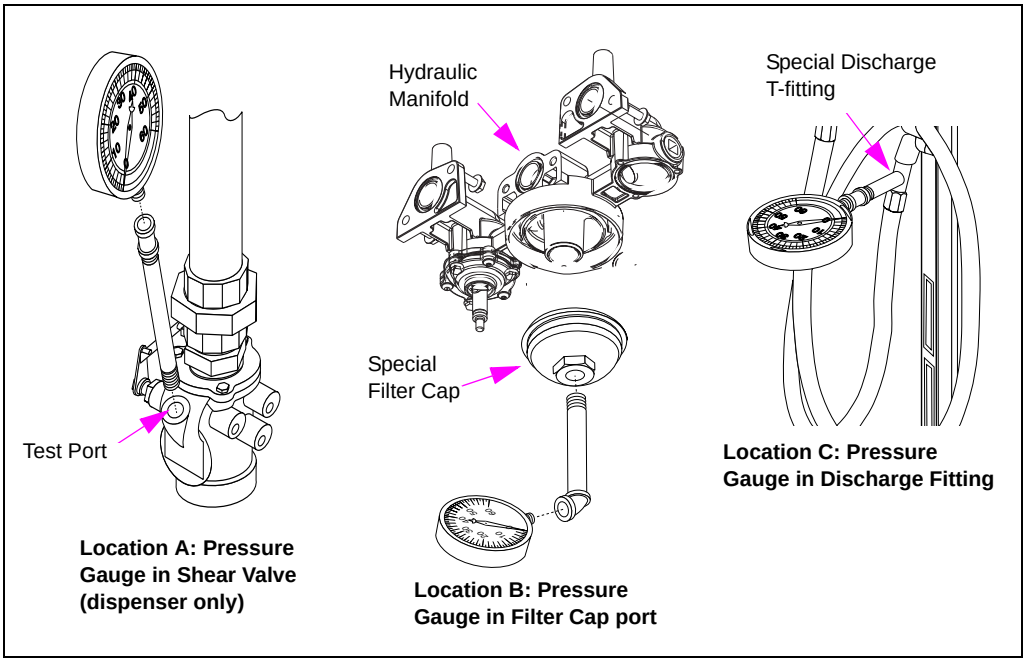
Pressure Measuring Locations on Unit

For Dispensers

Install the pressure gauge at any one of the following locations. See Figure 7-5 on page 7-14.

To Check	Insert the Pressure Gauge in the
Inlet pressure	Shear valve test port (Location A)
Internal pressure up to first valve	Port on special modified filter cap (Location B)
Discharge pressure	Special Discharge fitting (Location C)

Figure 7-5: Typical Pressure Gauge Installations


Test Port
Location A: Pressure Gauge in Shear Valve (dispenser only)
Hydraulic Manifold
Special Filter Cap
Location B: Pressure Gauge in Filter Cap port
Special Discharge T-fitting
Location C: Pressure Gauge in Discharge Fitting

Measuring STP Pressure for Dispensers

To measure STP pressure for dispensers, proceed as follows:

1. Turn off power to the STP.
2. Verify if the pump on STP has been deactivated.
3. Install the gauge at shear valve test port. See Figure 7-5, Location A.
   Note: Ensure that you use eye protection.
4. Activate nozzle. Do not pump fuel.
5. Read PSI on gauge. Actual operating pressure depends on STP horsepower. The following approximate pressures exist when not delivering fuel (consult manufacturer for exact performance values).
6. Refer to the following table for a representation of typical STP performance. Values for STPs with additional or fewer stages will vary from those in the following table.

Figure 7-6: Operating Pressure Chart

	Operating Pressure			
STP Horsepower	**Gasoline**		**Diesel**	
1/3 HP	26 PSI	76 kg-cm^2	30 PSI	88 kg-cm^2
3/4 HP	30 PSI	88 kg-cm^2	34 PSI	99 kg-cm^2
1-1/2 HP	30 PSI	91 kg-cm^2	35 PSI	102 kg-cm^2
2 HP	41 PSI	120 kg-cm^2	46 PSI	134 kg-cm^2
3 HP	31 PSI	91 kg-cm^2	35 PSI	102 kg-cm^2
5 HP	38 PSI	111 kg-cm^2	43 PSI	126 kg-cm^2

For Self-contained Pumps

See Figure 7-5 on page 7-14 (locations B and C).

- Install the pressure gauge to discharge side at a test port on special filter cap.
- Install pressure gauge downstream at nozzle or other locations as required.

Measuring Pressure Drop for Dispensers and Pumps

Use the pressure drop test to check specific parts (meters, shear valves, filters, and so on). An exceptionally high pressure drop for specific flow rates indicates that a part is clogged or defective.

To measure pressure drop for dispensers and pumps, proceed as follows:

1. Ensure that the pump handle is in the “off” position. For dispensers, close shear valve. Place nozzle in an approved container. Lift pump handle. Squeeze nozzle to bleed pressure.

2. Turn off power. Multiple disconnects may be required.

3. Install pressure gauges. See Figure 7-5 on page 7-14 for locations.
   Note: Ensure that you use eye protection.
   - For dispensers, install at shear valve test port or filter cap port and at the discharge special T-fitting.
   - For pumps, install pressure gauge at pumping unit discharge test port and the discharge special T-fitting.

4. Restore power to unit. Open shear valve. Lift pump handle. Activate nozzle and pump fuel at full flow into an approved container.

5. Measure flow rate and read PSI on both gauges. Return pump handle to “off” position.

6. Calculate pressure drop (pressure drop is the difference between PSI readings). See Figure 7-7 on page 7-16 for an example of desirable ranges.

7. Ensure that the pump handle is in the “off” position. If unit is a dispenser, close the shear valve. Place nozzle in an approved container. Lift pump handle. Squeeze nozzle and bleed pressure. Return pump handle to “off” position.

8. Turn off power.

9. Remove pressure gauges, purge air and restore unit to original operation.

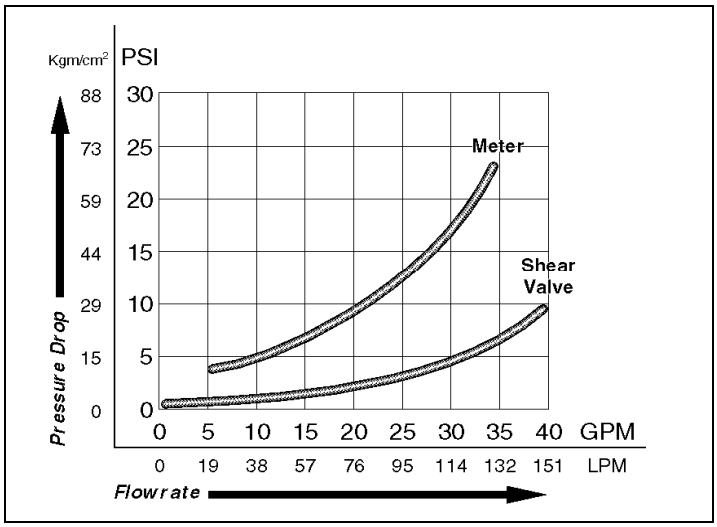
Analyzing Pressure Drop for Dispenser and Pumps

Pressure drop across components increases as total flow rate increases.

- Total system pressure drop = Product Lift from bottom of STP to dispenser base
  +Pressure drop through external piping
  +Pressure drop through dispenser including hose and nozzle.
- Pressure drop through external piping segments will vary depending on size and types of piping used.

If total system pressure drop at total flow rate is less than STP pressure at that flow rate, system will develop desired flow rate.

Figure 7-7: Graph for C+ Meter and 1-1/2 Inch Shear Valve



Determining if Component is Faulty

To determine if the component is faulty, proceed as follows:

1 Always check/replace filter and strainer before performing the test.

2 Determine dispenser pressure and flow rate at base of dispenser with nozzle wide open.

Note: If the pressure at the base of the dispenser is substantially lower, the dispenser is functioning correctly.

3 Compare observed flow rates to the actual inlet pressure for the dispenser model being checked. If the flow rate is low for the pressure, it is likely that the dispenser or hanging hardware problem exists. If readings are close to the specification, it is likely that the dispenser is OK and it is a system problem.

Use this table to evaluate the probable cause of dispenser low flow rate.

Low Flow Rate Symptom	Probable Causes
Observed pressure drop is more that a few PSI higher	Flow restriction
Observed and expected pressure drop is close to specification	Hanging hardware

Reaching Desired Flow Rates

Listed below are a few methods for meeting desired flow rate:

- Correct/replace faulty component.
- Use larger STP or manifolded STP.
- Use larger inlet piping to the pump/dispenser.
- Use less restrictive hoses and nozzles.
- Reduce maximum lift of product from tank.
- Use a higher capacity pump or dispenser model.

Measuring Vacuum (Pump)

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section, and related sections. Use OSHA Lock-out and Tag-out procedures.

Topics in this Sub-section

Topic	Page
About Vacuum Readings	7-17
Measuring Dry Vacuum for Pump	7-18
Measuring Wet Vacuum and Pressure for Pump	7-19

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing parts and fittings.

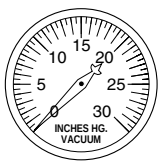
Fire and explosion could result in severe injury or death.

- Wear eye protection.
- Remove parts and fittings slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

About Vacuum Readings

Use vacuum readings to determine if the unit has the ability to move product from the storage tank to the pump. Inability to pull a vacuum may also indicate that air is entering the system. Use vacuum gauges that read in inches of mercury (scale 0-30 Hg).

Figure 7-8: Vacuum Gauge

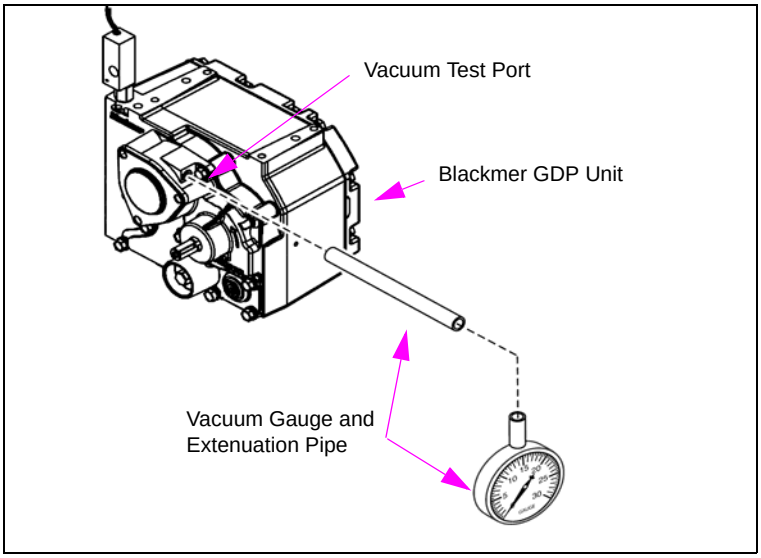


Typical Vacuum Gauge Dial Face

Measuring Dry Vacuum for Pump

Use this test to determine priming ability of a self-contained pumping unit (only run test if priming problems exist). Ensure that you follow all safety precautions.

Figure 7-9: Vacuum Gauge Port on GDP



To measure dry vacuum for the pump, proceed as follows:

1. Remove power from the unit. Multiple disconnects may be required. Use OSHA Lock-out and Tag-out procedures.
2. Drain Blackmer Global Dispenser Pump (GDP) unit of all fuel. Use an approved container. Refer to “Draining the GDP” on page 7-50 for details. Clean up any spills promptly.
3. Plug the pumping unit inlet. Use a flat rubber disc between the union halves or use a pipe plug in the lower half of the inlet union.
4. Check pump to motor belt tension. Refer to “Setting Belt Tension” on page 7-57 for details.
5. Restore power and turn the unit on.
6. Read vacuum gauge. Newly installed units should read 8 inches Hg (mercury) or above. Older units (about 1,000 hours of service) should read approximately 4 inches Hg.
7. After testing is complete, turn off power at circuit breaker.
8. Remove any barriers to fuel and install any plugs removed earlier.
9. Restore power and check for leaks.

Measuring Wet Vacuum and Pressure for Pump

This test should be performed when flow output is low or you are experiencing repetitive pump failures. Ensure that you follow all safety precautions.

1. Turn off power to the unit.
2. Check pump to motor belt tension. Refer to "Setting Belt Tension" on page 7-57 for details.
3. Install pressure and vacuum gages.
4. Restore power and operate the unit with both pressure and vacuum gauges attached. Use an approved container to collect fuel. Clean up any spills promptly.
5. Record discharge pressure with nozzle open and nozzle closed.
6. Record vacuum pressure with nozzle open and nozzle closed.
7. Record flow rate with nozzle open.
8. Compare readings with values in the following Acceptable Range Tables.

Acceptable Range Tables

The values listed in the following tables are approximate and may vary depending on site conditions, hardware used, age of units, and so on. Flow rates for standard gallonage are based on 5/8-inch hoses, 3/4-inch swivels, unleaded gas. Flow rates for high gallonage are based on 1-inch hoses and OPW7H nozzle.

Acceptable Ranges - Standard Measure

	Full Flow - All Nozzles Open			Bypass - Nozzles Closed	
Pump Configuration	**Inlet Vacuum (in Hg)**	**Discharge Pressure (PSI)**	**Flow Rate (GPM)**	**Inlet Vacuum (in Hg)**	**Discharge Pressure. (PSI)**
One Pumping Unit per Hose:					
Standard Flow	4-10	15-30	10-13	4-7	20-35
High Flow	6-12	25-40	18-24	5-8	28-45
One Pump Unit per two Hoses:					
Standard Flow	4-10	20-35	17-20	4-7	22-38

Acceptable Ranges - Metric Measure

	Full Flow - All Nozzles Open			Bypass - Nozzles Closed	
Pump Configuration	**Inlet Vacuum (cm Hg)**	**Discharge Pressure (Bar)**	**Flow Rate (LPM)**	**Inlet Vacuum (cm Hg)**	**Discharge Pressure (Bar)**
One Pumping Unit per Hose:					
Standard Flow	10.2-25.4	1.0-2.1	37-50	10.2-17.8	1.3-2.4
High Flow	15.2-30.5	1.7-2.8	68-90	12.7-20.3	1.9-3.1
One Pump Unit per Two Hoses:					
Standard Flow	10.2-25.4	1.3-2.4	64-76	10.2-17.8	1.5-2.6

Probable Causes of Low Flow Rate for Pumps

Use the following table to determine the causes of low flow rates:

Low Flow Rate Symptom	Probable Causes
The open nozzle vacuum reads high, pressure reads low, and closed nozzle pressure is normal.	• Check valve sticking, closed, or partially closed • Pumping unit strainer dirty • Supply line obstructed or restricted • Spring loaded check valve in supply line • Storage tank air vent plugged • Undersized supply line for unit • Tank too far or too deep (no further than 50' away and 10' deep) • Vapor lock
The open nozzle vacuum reads low or normal, pressure reads high, and closed nozzle pressure is normal.	• Hose crushed • Nozzle defective • Meter binding • Discharge piping obstructed • Filter dirty • Bypass valve defective or sticking • Regulator or check relief valve defective or sticking • Solenoid valve defective
The open nozzle vacuum reads low and pressure reads low; closed nozzle vacuum reads low and closed nozzle pressure reads normal.	• Belt slipping • Pump operating below specified rpm rate • Pumping unit parts worn • Sump float valve malfunctioning • Leak in supply line between tank and pump • Relief valve stuck open
Surging or hesitation occurs.	• Supply line check valve defective • Leak in supply line that traps air • High spots in supply line
Motor stalls or burns out.	• Relief valve sticking • Motor defective • Low voltage or defective wiring • Debris in pump • Broken pump elements

Calibration

Read and follow all safety precautions as outlined in “Read this First” on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out Tag-out procedures.

Topics in this Sub-section

Topic	Page
About Calibrating Meters	7-21
About Calibrating VaporVac	7-21

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing parts and fittings.

Fire and explosion could result in severe injury or death.

- Wear eye protection.
- Remove parts and fittings slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

About Calibrating Meters

Encore 300 units are shipped uncalibrated. Encore 500 and Eclipse units shipped after December 1, 2002 are shipped with initial factory calibration.

Note: All meters, including factory-calibrated meters, must still be checked for accuracy after purging air from system.

Before calibrating, you must properly purge air from the system; air in the system will affect calibration accuracy. Refer to “Purging Air from the System” on page 7-7 for details. After completing calibration, the Weights and Measures switch must be sealed per local authority. All replacement meters must be calibrated after installation and testing.

IMPORTANT INFORMATION

All meters must be checked for accuracy after purging air from system in new or existing systems. Air in the system will affect calibration accuracy.

Encore 300 NJO and NJ1: Six hose blends, the Grade 1 switch when selected, always calibrates the “w” product meter regardless of how the blend ratios are set for Grade 1. Grade 2 and Grade 3 switches always calibrate the “x” product regardless of how the blend ratios are set. Other blended models rely on the programmed blend ratios to determine which meter is calibrated.

For details on calibrating meters, refer to "Pump Programming" section on page 5-1 of this manual.

About Calibrating VaporVac

For details, see “Calibrating VaporVac” on page 7-73.

Filters and Strainers

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Topics in this Sub-section

Topic	Page
About Filters	7-22
Servicing Filters	7-23
About Strainers	7-25
Servicing Strainers	7-25

Note: To prevent fueling problems with vehicles and to minimize dispenser down-time due to damage to valves and motor, never operate a unit without the use of a filter or strainer.

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing parts and fittings.

Fire and explosion could result in severe injury or death.

- Wear eye protection.
- Remove parts and fittings slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

About Filters

A noticeably slower flow rate very commonly indicates a dirty filter or clogged strainer. Very slow flow rates also result from water alert filters if water is in the tank.

For efficient operation and long life of pumps and dispensers, replace fuel filters and clean strainers regularly.

- After 50,000 gallons (189,000 liters) or one month for new installations
- Every 300,000 gallons (1,134,000 liters) or six months thereafter

Notes:1) Harsh environments, including old steel fuel storage tanks, may require changing filters and cleaning strainers more frequently.

2) Conversions from non-alcohol to alcohol enhanced fuels will typically result in less frequent filter changes due to the cleaning effect of alcohol in the tanks and piping.

Always use Gilbarco filters (standard, water alert, and high capacity).

Filter	Description	Part Number	Where Used
Standard flow	Standard 10 micron nominal Hydrosorb 2 Water Alert for gasoline, diesel, and other blend fuels	R20039	Encore, Eclipse
	Standard 10 micron nominal Alcohol Monitor for alcohol blend fuels	R19736-10	Encore, Eclipse
High capacity	High capacity 30 micron nominal Particulate for all fuels (11" long)	M02264B001	Encore Ultra-Hi

Servicing Filters

Before Removing Filters

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Before removing the filters, proceed as follows:

1. Close shear valve (dispensers only). Check operation of valve. May require multiple shear valve closures. For pumps, turn-off all power to the pump.

2. Bleed pressure (dispensers only):
   - Lift operating handle and authorize unit.
   - Place nozzle in approved container.
   - Close nozzle.
   - Turn off operating handle.

3. Turn off associated STP circuit breakers (dispensers only). May require multiple STP disconnects.

4. Turn off dispenser circuit breaker. Turn off all power to the unit.

Removing Filters

⚠ WARNING

Servicing filters without properly turning off power and ensuring that the appropriate valves are closed, may result in fuel discharge or spray. Any involved STPs with power still applied can be energized from another unit resulting in fuel pressure in the product lines for the unit you are working on. Pumping units with power applied could also be accidently energized. You may not be able to retighten filter to stop fuel flow.

Fire and explosion could result in severe injury or death.

Ensure that you:
- Wear eye protection.
- Test and close the involved shear valves.
- Remove power to pump, dispensers and any involved STPs.
- Remove parts slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may spray when removing parts.

Fire and explosion could result in severe injury or death.

Ensure that you follow all safety instructions and are prepared for any residual fuel pressure.

Use an approved container to collect residual fuel. Use gasoline/fuel approved absorbent materials to mop up spilled fuel. Use Gilbarco fuel collectors, if applicable.

To remove the filter, proceed as follows:

1 Remove the filter slowly, by turning it counterclockwise.

2 Drain the removed filter into an approved container and dispose of properly (do not dispose of filters and fuel soaked absorbent materials in trash cans). Follow local, state and national code requirements for disposal. Use of fuel catch cup or pan is recommended.

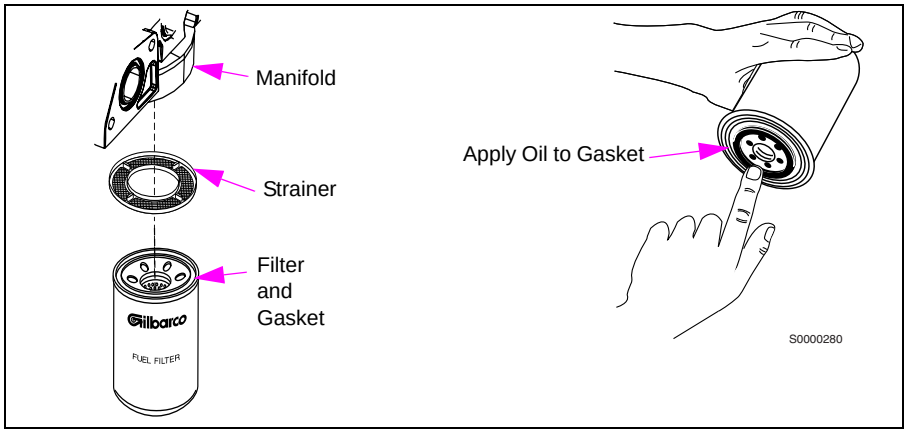
3 Remove the strainer and clean. Refer to "Servicing Strainers" on page 7-25 for details.

Installing New Filters

To install a new filter, proceed as follows:

1 Read and follow instructions printed on the new filter.

Figure 7-10: Coating Filter Gasket



2 Install the strainer properly.

3 Coat the new filter gasket with a thin film of clean oil as shown in Figure 7-10.

4 Attach filter to hydraulic manifold and turn clockwise until the gasket touches the base. Then, hand-tighten an additional 1/2 turn.

5 Restore power.

6 Open shear valve on dispensers.

7 Lift nozzle hook and authorize pump.

8 Check for leaks.

9 Bleed air by dispensing 10 gallons (40 liters) into an approved container for each hose involved.

10 Check for leaks again.

Service Tips

- Hand-tighten filter only. Do not use filter wrench to tighten.
- A light coating of oil on the gasket helps seal to seat properly and allows for easier release at time of removal.

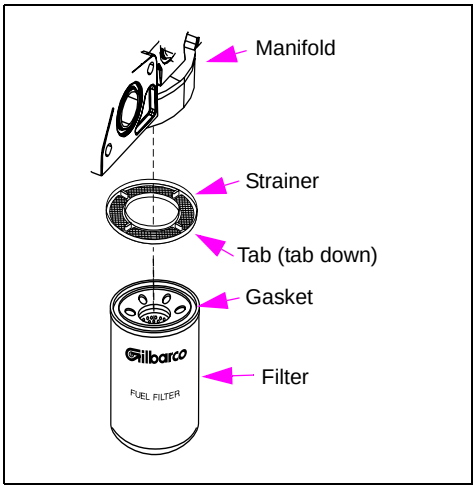
About Strainers

Strainers are installed between the manifold and filter to trap larger particles leaving fine filtering to be done by the filter element. The strainer helps to prolong filter life by preventing premature filter clogging. Always re-install or replace strainer.

Servicing Strainers

Cleaning/Replacing Standard and High Flow Filter Strainers

Figure 7-11: Filter and Strainer Assembly



To clean/replace a standard and high flow filter strainer, proceed as follows:

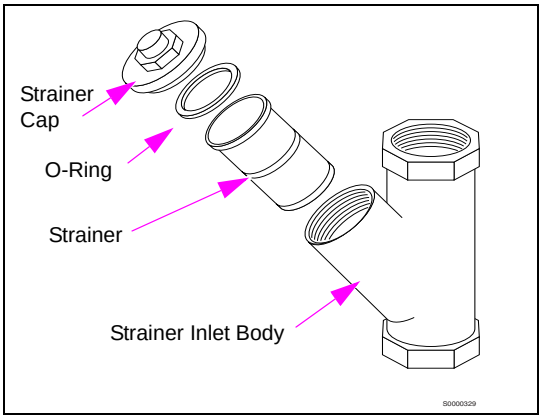
1 Remove strainer located between filter and filter base. Use needle nose pliers to remove strainer, while being careful not to damage strainer.

2 Clean strainer with a soft brush and alcohol. If strainer is permanently clogged or damaged, replace strainer. Dispose of rejected strainer properly.

3 Install cleaned or new strainer back into bore with tabs facing toward the filter cartridge.
Note: Failure to use a strainer will void the meter and valve warranty.

Cleaning/Replacing Ultra-Hi Inlet Strainer

Figure 7-12: Ultra-Hi Dispenser Strainer Assembly



To clean/replace an Ultra-Hi inlet strainer, proceed as follows:

1 Close shear valve. Inspect operation of valve. Refer to "Shear Valves" on page 7-66 for details.

2 Bleed pressure:
- Lift operating handle and authorize unit.
- Place nozzle in approved container.
- Open nozzle to reduce system pressure.
- Close nozzle.
- Turn off operating handle.

3 Turn off involved STP circuit breakers.

4 Turn off dispenser circuit breakers.

5 Clean area around strainer cap.

6 Remove strainer cap by slowly turning it counterclockwise. Watch for residual pressure causing spray. Clean up spills promptly.

7 Remove strainer and inspect for clogging. Clean with a soft brush and alcohol, or replace if needed.
Note: Do not tap the strainer on a hard surface to dislodge particles.

8 Insert the strainer in housing.

9 Clean the strainer cap, seal ring and strainer body. Inspect cap seal ring for damage (hardening or distortion). Replace as needed. Coat O-Ring with a thin film of oil before replacing cap. Refer to "Servicing Seals, O-Rings and Gaskets" on page 7-4 for details.

10 Replace the cap, turning clockwise, and tighten securely.

11 Purge air after service. Refer to "Purging Air from the System" on page 7-7 for details.

12 Check for leaks after assembling and purging air from the system.

Hanging Hardware

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Topics in this Sub-section

Topic	Page
About Hanging Hardware	7-27
Hoses and Flow Restrictors	7-28
Breakaways	7-29
Testing Hose and Hanging Hardware Continuity	7-31
Adjusting Nozzle Hook for Specific Nozzles	7-33

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing parts and fittings.

Fire and explosion could result in severe injury or death.

- Wear eye protection.
- Remove parts and fittings slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

About Hanging Hardware

Hanging hardware are the components that attach to the outlet casting. This includes hose, nozzles, swivels, spacer hose and breakaways. Hanging hardware is tested for leaks and electrical continuity. Hanging hardware can be composed of other manufacturer's components. Ensure that you follow manufacturer's recommendations.

Hoses and Flow Restrictors

Inspecting Hoses

Check hoses regularly (at least once a week) for leaks and damage. Inspect, and replace hose assembly as needed. The following conditions may indicate damage or an impending problem:

- Twisting and curling puts unusual stress on hose parts.
- Repeated flexing of hose in the same spot can cut, tear or split the hose cover.
- Flattened hoses cause restricted flow and cause hose reinforcement damage.
- A soft spot is a sign of internal damage to the hose reinforcement. Reinforcement may appear through the cover.
- Loose or cracked hose couplings can cause a fuel spill.
- Hose bulges are a sign of pressurized gasoline pushing against the cover. A full rupture could occur at any time.

Hose Retrieval Mechanisms

Hose retrieval mechanisms must be operational or a trip hazard could exist. Do not use hose longer than the recommended length, without a hose retrieval system.

Replacing Hoses

Do not use soft-wall hoses. They can cause the unit to register with nozzle closed when the nozzle hook is first raised. Always use UL-approved hoses designed for the fuel being dispensed. Read and follow all safety precautions. Follow OSHA Lock-out and Tag-out procedures.

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may spray when removing hoses.

Fire and explosion could result in severe injury or death.

- Wear eye protection.
- Remove hoses and nozzles slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

To replace the hose, proceed as follows:

1. On dispensers, close the shear valve. Check for proper shear valve operation. Units may require multiple shear valve closures.

2. Turn off power to the unit and associated STPs. Multiple STP disconnects may be required. Use OSHA Lock-out and Tag-out procedures.

3. Drain nozzle and hose into approved container.

4. Remove nozzle first, then hose.

5. Install swivel couplings and breakaways to unit as needed.

6 Use UL-approved pipe sealant on hose coupling threads. Follow these recommendations:
- Do not use Teflon tape. Teflon tape on these components can cause damage during assembly or installation and defeat the conductive property of the handing hardware and cause nozzles to malfunction.
- Do not apply sealant to first two threads of hose coupling.
- Do not use sealant on O-Ring seals (a light coating of oil or silicone grease is advised).
- For co-axial and tri-axial vapor recovery hoses, inspect and lubricate all O-Ring seals with silicone grease to aid assembly.

7 Install hose assembly to pump end first, then to nozzle. Always attach hose assembly by rotating hose and coupling. Screw coupling in securely. Do not over-tighten. Do not use zinc die cast couplings on standard hoses. Use only chrome plated brass couplings. Use an open end wrench to protect chrome finish.

8 Check hose hanging hardware for continuity. Refer to "Testing Hose and Hanging Hardware Continuity" on page 7-31 for details. Replace components if necessary.

9 Install padded or contoured plastic hose clamps and retractor cables properly. In all instances, do not install hose retractor clamps downstream of the breakaway.

10 Restore power. Open shear valve for dispensers.

11 Check for leaks.

12 Bleed system of air. Refer to "Purging Air from the System" on page 7-7 for more information.

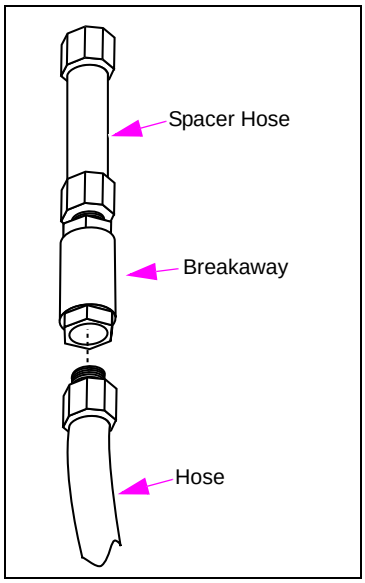
13 Check for leaks again.

Breakaways

Emergency breakaway couplings help protect against fuel spill, fire hazard and equipment damage. The breakaway valve stops flow during drive-offs if the nozzle or hose loop catches on the vehicle. Always use UL-listed breakaways.
- For proper operation of breakaways, always bolt the dispenser/pump securely to the island. Refer to Gilbarco installation instructions for pumps and dispensers.
- Some breakaway manufacturers require you test the dispenser/pump for pull strength before installing the device. Follow the manufacturer's instructions.
- For overhead units, install the spacer hose into the overhead outlet casting first, followed by the breakaway and the hose.
- When used, a hose retention coupling must never be installed between the breakaway and the nozzle.
- When installing breakaways, always use wrench on breakaway Hex or wrench flats only.
- Always use pipe sealant for connections (except on O-Ring fittings). Never use Teflon tape.
- Some breakaways are reusable. Follow breakaway's manufacturer instructions on inspection and reuse.
- Periodically and after a drive-off, check breakaway hoses and couplings for hose continuity. Refer to "Testing Hose and Hanging Hardware Continuity" on page 7-31 for details.

Reinstalling or Replacing Breakaways

Figure 7-13: Typical Breakaway



To reinstall or replace breakaways, proceed as follows:

1. Close and test shear valve. Units may require multiple shear valve closures. Also refer to manufacturers' instructions.
2. Turn off power to the unit and associated STPs. Use OSHA Lock-out and Tag-out procedures.
3. Drain nozzle and hose into an approved container. Clean up any spills promptly. Be prepared for any residual pressure that may still exist in the hanging hardware.
   Note: Ensure that you use eye protection.
4. Check for damage to nozzle (especially the spout and threads).
5. Perform a hose continuity test. Refer to "Testing Hose and Hanging Hardware Continuity" on page 7-31 for details.
6. Inspect unit for structural, meter and piping damage. Repair or replace damaged components as necessary.
   Note: Meters, piping and connections may leak after a drive-off.
7. Replace breakaway if it is not the reusable type.
8. Check for damage to breakaway valve and seals before reassembly. Follow manufacturer's instructions.
9. Follow manufacturer's instructions for cleaning and lubricating seals and valve ends.
10. Follow manufacturer's instructions for recoupling.

11 Restore power and open shear valves.

12 Authorize nozzle and check for leaks in hose and plumbing area (especially the meter and filter).

13 Purge system of air. Refer to "Purging Air from the System" on page 7-7 for more information.

14 Check for leaks again. Ensure that you check meter and internal piping if a drive-off was involved.

Service Tips

- Do not reuse a separated breakaway if any part appears damaged.
- Some manufacturers require lubrication of breakaways every six months. Others require only periodic visual inspections. Follow their recommendations.
- Inspect breakaways for leaks at least once a week.
- If breakaway separates without a drive-off occurring, do not reuse.
- Consult manufacturer for the maximum number of times you can reset a breakaway. Some breakaways are not resettable.
- A protective sleeve supplied by manufacturer is recommended to avoid damage to dispenser and to improve appearance.

Testing Hose and Hanging Hardware Continuity

Perform an electrical continuity check when installing hoses, after a drive-off, and for periodic preventive maintenance. The STP check valve or pump regulating valve must maintain operating pressure to perform this test. The following procedure tests the continuity of the hanging hardware (that is, hose, nozzle, swivel, breakaway, and hose casting).

⚠ WARNING

Hanging hardware without the proper electrical continuity rating presents a risk of igniting fuel vapors.

Injuries or death may result if hose continuity is not maintained.

Use approved procedures to test for hanging hardware continuity. Refer to PEI/RP400-02 in addition to equipment and component manufacturer's instructions for additional information.

⚠ WARNING

You are working in a potentially dangerous environment of flammable fuels/ vapors. Fuel and its vapors may ignite, leading to serious injury or death. Fire, explosion or electrical shock could result in severe injury or death if you do not follow safe procedures.

Ensure that you correct any safety hazards and barricade the area. Follow manufacturer's instructions for the safe use, operation and maintenance of the testing equipment.

Use only a low voltage digital ohmmeter. Do not test continuity if there is spilled fuel, leaking components, or fuel vapors present in the area. Be familiar with hazardous zones requirements. Do not turn tester on until after connections are made. Turn tester off before disconnecting test clips.

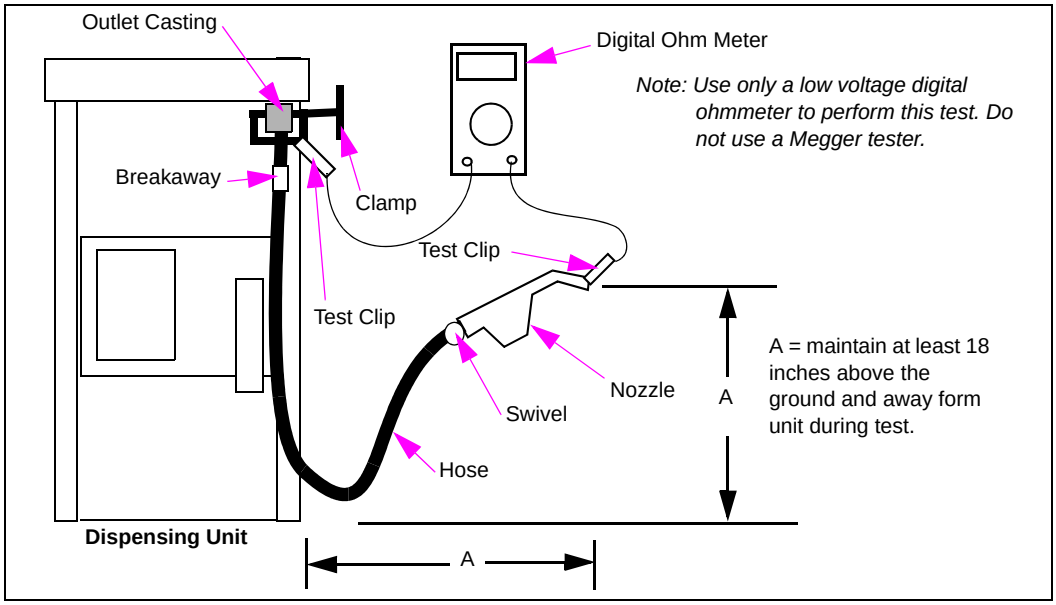
To test the hose and hanging hardware continuity, proceed as follows:

1 Ensure that there is no liquid fuel or flammable vapors present. Clean up as necessary.

2 Lift the nozzle hook and authorize the unit to pressurize hose.

3 Lower the nozzle hook.

Figure 7-14: Testing Hanging Hardware Continuity



4 With meter off, connect one probe to the nozzle spout, the other probe to fuel outlet fitting at outlet casting or other component grounded with the unit's frame (see Figure 7-14 on page 7-32). Probe contact surface must be clean and free from fuel or other contamination.
   - Use test leads at least 3 feet long (1 meter) equipped with insulated clips.
   - Typical meter test clips are not suited for direct attachment to hanging hardware. Use appropriate clamping device to ensure good contact.
   - Keep the nozzle at least 18 inches above the ground and 18 inches away from the dispenser during test.
   - Wear insulating gloves if hanging hardware component is handheld during test or use an insulated device to support nozzle. Refer to PEI/RP400-02 for additional information.

5 Testing continuity: Turn meter on to conduct test.
   - Measure resistance while flexing and moving hose and nozzle into various positions that could be reasonably expected during fueling.
   - Keep good electrical contact between probes and contact locations.

6 If test reading complies with UL330 which states that resistance should not exceed 70,000 ohms per foot (233,000 ohms per meter), the hanging hardware has passed the continuity test.

   If test readings exceed 70,000 ohms per foot:
   - Perform continuity test between junction box and hose discharge casting on pump or dispenser. This helps verify dispenser continuity and adequacy of test point locations.
   - If no problem exists here, then isolate defective part by performing continuity tests between and across hose, nozzle, swivel, breakaway, and hose casting. Replace part if resistance exceeds manufacturer's recommended maximum limit.
   - Do not use components if test reading shows an open circuit, no resistance, or other defect.

Adjusting Nozzle Hook for Specific Nozzles

The following instructions are intended to adjust the position of the Gilbarco Encore dispensing unit nozzle hook to accommodate various manufacturer's manuals. Notify site personnel and secure the work area. Isolate dispensing unit from point-of-sale or pump controller and close shear valves. Follow all safety precautions.

Tools Required to Modify Nozzle Boot:
- Drill
- 7/32 or #22 drill bit
- 1/4 inch square-tip driver
- 7 mm metric Hex nut driver or socket
- 3/8 inch nut driver or socket

⚠ WARNING

AC or battery powered drills must not be used at the dispensing unit. There exists a danger of explosion or fire due to the presence of hazardous vapors.

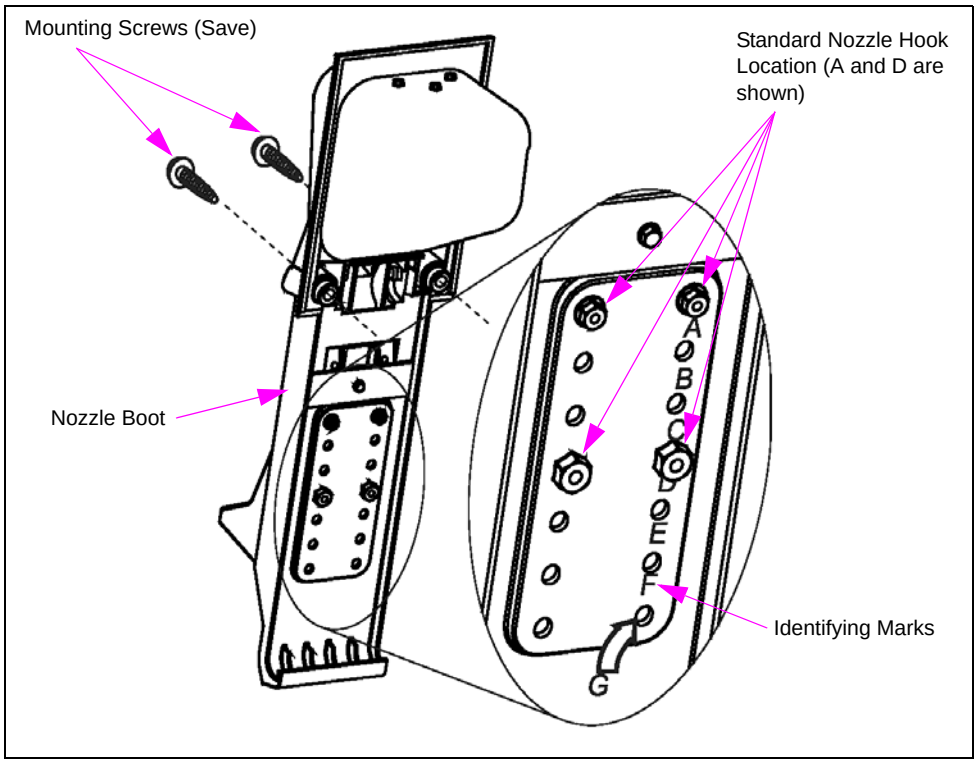
Removing Existing Nozzle Boot

To remove the existing nozzle boot, proceed as follows:

1 Remove nozzle(s) from nozzle boot(s) and place on ground.

2 Loosen two nozzle boot mounting screws and remove boot from dispenser by pulling it towards you (see Figure 7-15) using 1/4 inch square tip driver. Save nozzle boot mounting screws to be reused.

Figure 7-15: Nozzle Boot



3 Place nozzle boot face down on the soft cloth to protect the nozzle boot face.

4 See Figure 7-15 to identify existing nozzle hook retaining screw and nut locations. (Identifying marks are located under right hand row of indented hole locations). Standard nozzle hook locations are A and D.

5 Use a 7 mm nut driver or socket to remove the two upper Hex head screws.

6 Use a 3/8 inch nut driver or socket to remove two nuts from lower carriage bolts.

7 Remove nozzle hook and carriage bolts from the nozzle boot. Save Hex head screws, carriage bolts and nuts.

Positioning Nozzle Hook for Specific Nozzles

Determine the new nozzle hook position using the chart below as the guide to select new hole positions. Refer to Figure 7-15 on page 7-34 to identify existing nozzle hook retaining screw and nut locations. Identifying marks are located under right hand row of indented hole locations.

Nozzle Type	Upper Hex Head Screw Location	Lower Carriage Bolt and Nut Location
Standard Factory Location All Non-Vapor	A	D
VaporVac - OPW, Husky, Emco-Wheaton	A	D
VaporVac - Catlow, Richards	B	E
Healy System	C	F
Balance - Husky Short	A	D
Balance - Husky Long, Emco Wheaton Long	E	Unmarked. Use nozzle hook carriage bolt holes as drill guide.
Balance - OPW Long	Bottom hole set (“G” on Figure 7-15 on page 7-34)	Unmarked. Used nozzle hook carriage bolt holes as drill guide.

Drilling Holes

To drill holes, proceed as follows:

1. Use 7/32 inch or # 22 drill bit to drill new holes as needed.
2. When locations “E” or “G” are used by the upper Hex head screws, the lower carriage bolt and nut hole set are unmarked. Temporarily mount the nozzle hook with the upper Hex head screws in location “E” or “G” (as determined by chart), then use the nozzle hook carriage bolt holes as a drilling guide for the unmarked hole set.
3. Once holes are drilled, remove nozzle hook and clean up debris around hole set.

Assemble Nozzle Hook to Nozzle Boot

To assemble the nozzle hook to the nozzle boot, proceed as follows:

1. Locate nozzle boot on dispenser and insert nozzle hook and carriage bolts into nozzle boot. Attach using Hex head screws, carriage bolts and nuts.
2. Use a 3/8 inch nut driver or socket to tighten the two nuts onto lower carriage bolts.
3. Use a 7 mm nut driver or socket to attach the two upper Hex head screws.
4. See Figure 7-15 on page 7-34 to identify existing nozzle hook retaining screw and nut locations (identifying marks are located under right hand row of indented hole locations). Standard nozzle hook locations are A and D.

Dispenser Nozzle Boot Installation

To install the nozzle boot, proceed as follows:

1 Position nozzle boot over correct positioning holes for nozzle type.

2 Using the two existing screws, attach the nozzle boot to the dispenser.

3 Hold nozzle boot upright and insert nozzle over nozzle hook and into boot. Wiggle boot to verify if the nozzle does not slip out of position.

4 Power the unit and verify proper operation.

Nozzle Boot Spring Repair (SB1483)

Encore lift-to-start (fipper) nozzle boots are being replaced to correct a broken spring condition. If the failure is just the spring, replace only the spring (M00349B003).

Manifolds

Read and follow all safety precautions as outlined in the "Read this First" on page 1-1, in this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Topics in this Sub-section

Topic	Page
About Hydraulic Manifolds	7-37
Hydraulic Tree Assemblies	7-37
Steering Manifold	7-38
Configuration Manifold	7-40

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing parts and fittings.

Fire and explosion could result in severe injury or death.

- Wear eye protection.
- Remove parts and fittings slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

About Hydraulic Manifolds

The hydraulic manifold is a fluid input chamber where fluid is distributed into one or two outlets. The manifolds included in this section are:

- Hydraulic Tree Assembly
- Steering Manifold
- Configuration Manifold

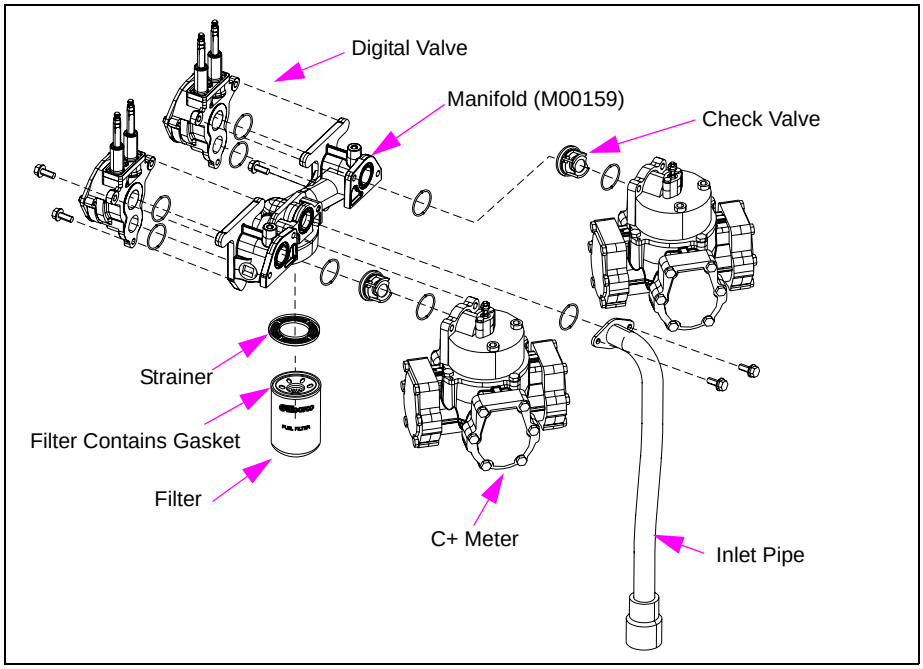
Note: Do not over-torque inlet piping into hydraulic manifold.

Hydraulic Tree Assemblies

The Encore manifold, meters, valves and filter make up the hydraulic tree. There are two versions that are distinguished by different valves and manifolds. For units with digital valves, refer to "Manifold (M00159) With Digital Valves" on page 7-37, and for units with proportional valves, refer to "Manifold (M02656) with Proportional Control Valves" on page 7-38.

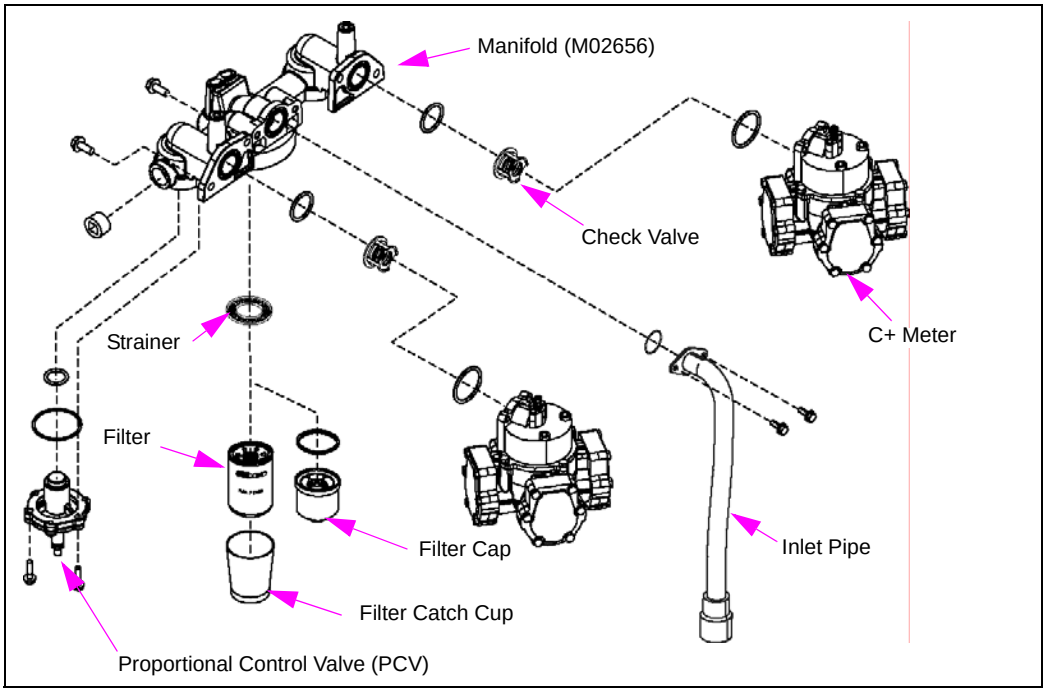
Manifold (M00159) With Digital Valves

Figure 7-16: Hydraulic Tree With Digital Valve



Manifold (M02656) with Proportional Control Valves

Figure 7-17: Hydraulic Tree with PCV



Service Tips

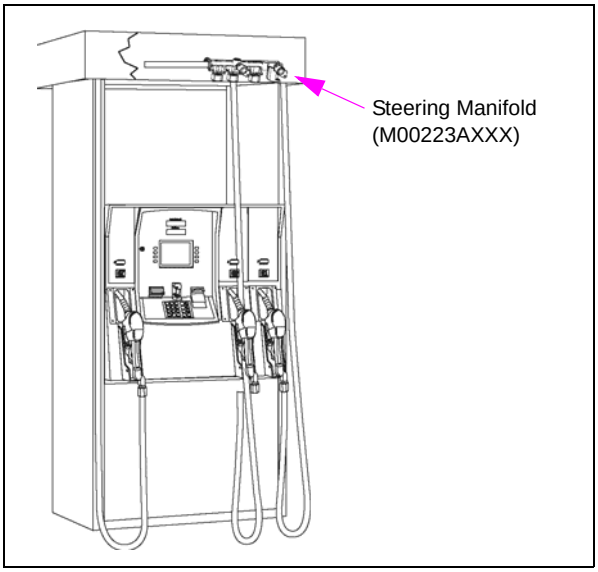
- To avoid damage to the hydraulic manifold, always keep the inlet piping support U-bolt in place.
- When replacing inlet union nipple, loosen the U-bolt only enough to allow nipple to turn with wrench. Do not pull the wrench and pipe up and toward you while turning. Upon completion of service, U-bolts must be tight and in place to ensure proper operation of shear valve during impact.
- When replacing filters, refer to "Filters and Strainers" on page 7-22.

Steering Manifold

The Encore series steering manifold and valves are located in the upper housing of six-hose Encore blenders (multi-hose) to direct the fuel to the proper hose. Attached to the steering manifold are three steering valves. These valves ensure that only the selected hose is activated. The valve is activated by the unit's electronics to open the appropriate chamber to direct the fuel. Fuel enters steering manifold through the Low and High product lines.

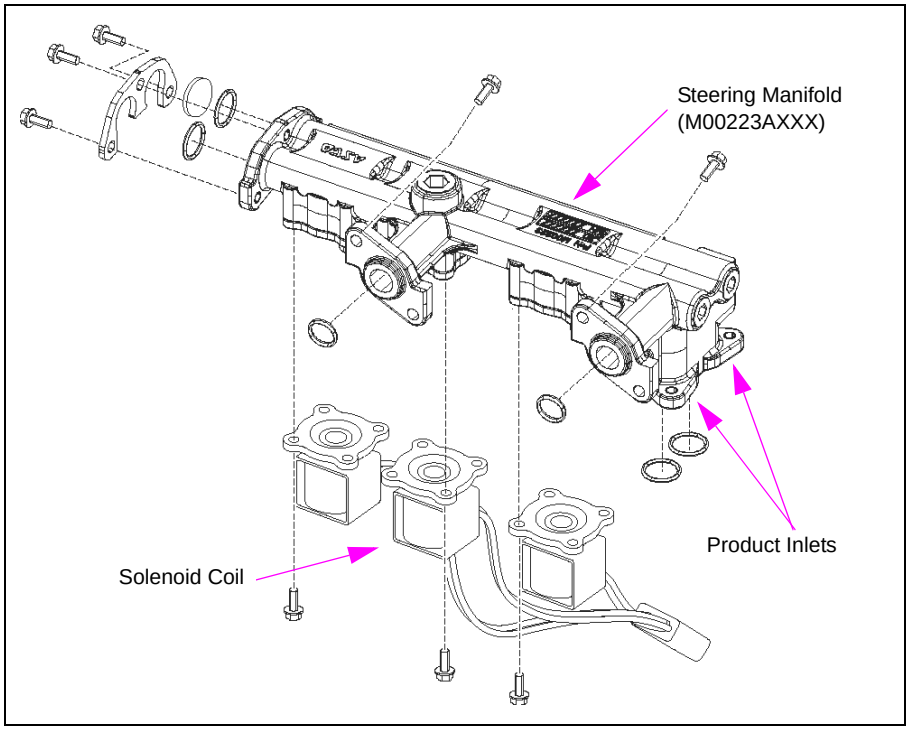
Eclipse series units are not configured as a multi-hose blender and therefore do not require a steering manifold. Refer to "Solenoid Valves" on page 7-67 for more information.

Figure 7-18: Steering Valve Manifold in Multi-hose Blender.



Steering Manifold (M00223AXXX)

Figure 7-19: Steering Manifold Components



Service Tips

- The main problems that you will notice with the steering valve manifold are: leaks at the connection points and valve seals, coil related problems and no flow with certain products.
- Ensure that filters and stainers are in place. Non-use of filters and strainers can cause this and other valves to fail.
- For additional information on seal problems, refer to "Servicing Seals, O-Rings and Gaskets" on page 7-4.

Configuration Manifold

The configuration manifold channels fuel to the proper hose outlet and is incorporated into the fuel discharge assembly mounted in the upper housing of Encore series units manufactured as of March 2002. This manifold is not incorporated into Encore six-hose blenders and Eclipse series units.

This configuration manifold is of open-closed or blend design and allows unit conversions from single-hose blenders to standard units and vice-versa without major rework. Refer to the following description, any conversion kit instructions, and Figure 7-22 on page 7-42.

- Open Manifold - The passages in this manifold allows fuel from all fuel discharge pipes to be channeled to one hose outlet. The open configured manifold is primarily used for single-hose MPD.
- Closed Manifold -The passages in the closed manifold channel fuel from the discharge piping to be separated and directed to separate outlets. The closed manifold design is used primarily on multi-hose units.
- Blend Manifold - The blend manifold allows two different grades of fuel to mix just prior to being discharged to the outlet casting.
  Note: The Blend Manifold is used primarily on blender units.

Model	Configuration	Manufactured
Encore	All except 6 Hose Blender	Prior to March 2002
	All except 6 Hose Blender	March 2002 and after
	6 Hose Blender	N/A*
Eclipse	Any unit	N/A*

** Configuration manifold not applicable to these units.*

Figure 7-20: Configuration Manifold Location

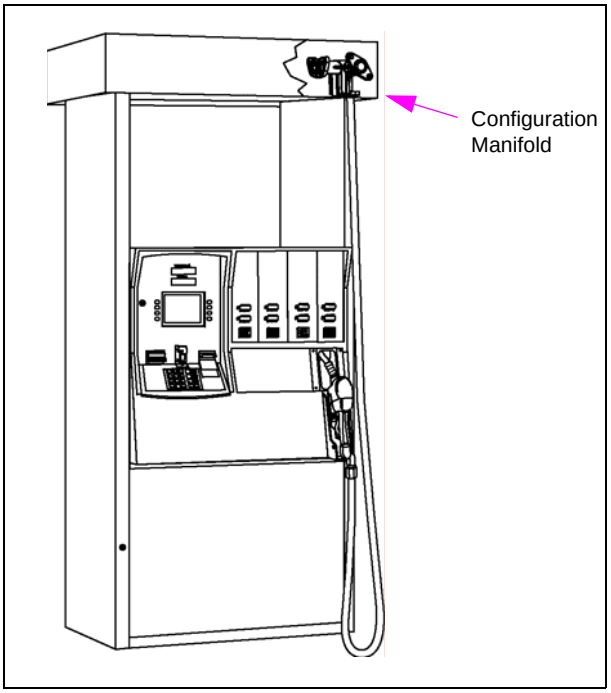
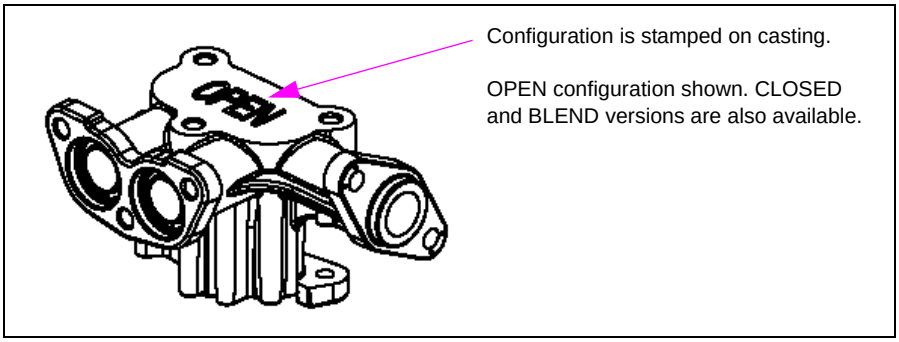


Figure 7-21: Configuration Manifold



The following cutaways show the features of each type of configuration manifold.

Figure 7-22: Open Configuration Manifold Cutaway

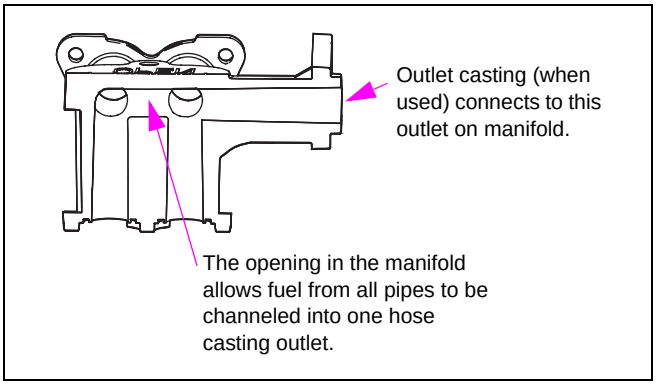

Outlet casting (when used) connects to this outlet on manifold.
The opening in the manifold allows fuel from all pipes to be channeled into one hose casting outlet.

Figure 7-23: Closed Configuration Manifold Cutaway

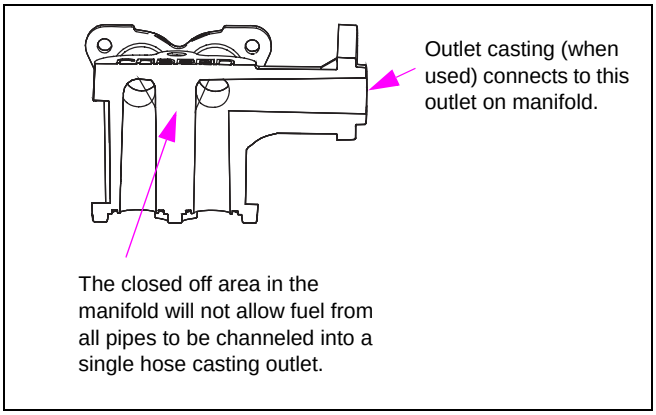
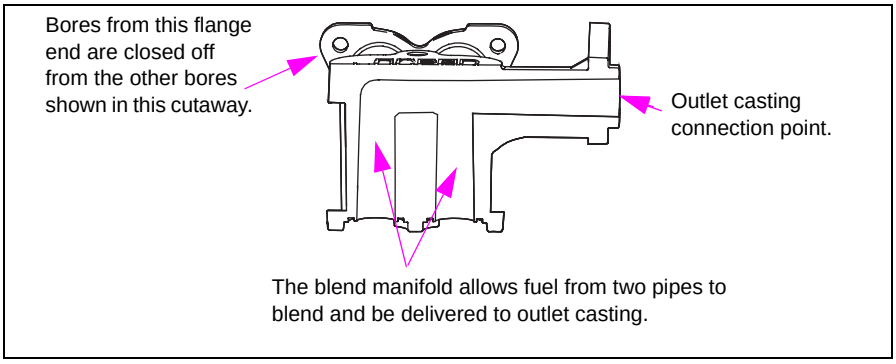

Outlet casting (when used) connects to this outlet on manifold.
The closed off area in the manifold will not allow fuel from all pipes to be channeled into a single hose casting outlet.

Figure 7-24: Blend Configuration Manifold Cutaway


Bores from this flange end are closed off from the other bores shown in this cutaway.
Outlet casting connection point.
The blend manifold allows fuel from two pipes to blend and be delivered to outlet casting.

Meters

Read and follow all safety precautions as outlined in the "Read this First" on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Topics in this Sub-section

Topic	Page
About Meters	7-43
C+ Meter	7-43
LC Meter (Encore Ultra-Hi)	7-45
ISD Vapor Flow Meter (see Vapor Recovery section)	7-75

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing hoses.

Fire and explosion could result in severe injury or death.

- Wear eye protection.
- Remove hoses and nozzles slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

About Meters

Gilbarco C+ meters are used on standard Encore units; refer to C+ Meter for more information. For Encore Ultra-Hi units, refer to "LC Meter (Encore Ultra-Hi)" on page 7-45. Gilbarco does not recommend a major field overhaul of the meter. Suggested repairs are related to fixing external leaks. The only serviceable parts on the meter are gaskets and seals. Most repairs require removing the meter from the unit. Automatic Temperature Compensation (ATC) equipped C+ meters have a special cover to accommodate probe end and test wells.

Model and Date Codes

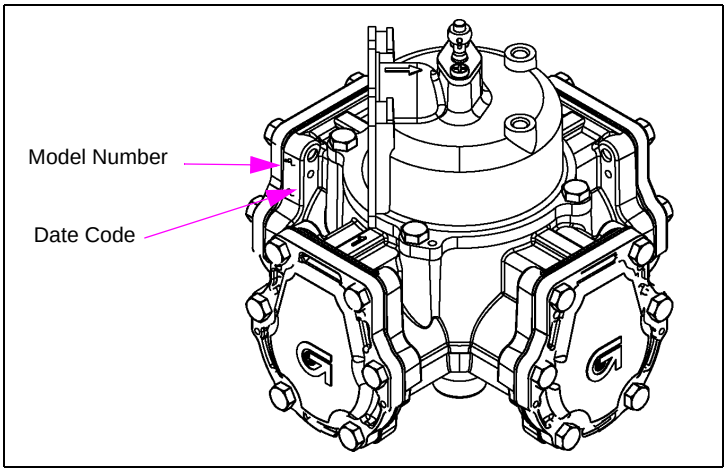
Model number is stamped on each meter (see Figure 7-25 on page 7-44). Refer to Model Configurations for a breakdown of this designation.

C+ Meter

The C+ Meter is a positive displacement piston meter where fluid is pushed into a cylinder which causes the opposing piston to push a similar cylinder of fluid out. The piston connecting rod converts the piston movement into rotation of the pulser shaft. The C+ meter has a flow path that discharges product from the center chamber on the bottom of the meter. This configuration reduces water and contaminants from building up in the meter, thus resulting in longer meter life.

The C+ meter is electronically calibrated. C+ meters for the Encore 300 are not shipped calibrated from factory and precise calibration must be performed at start-up. Encore 500 and Eclipse units built after December 2002 are shipped with initial factory calibration. An error message is displayed if calibration at start-up is not completed. Meter calibration must always be verified at start-up.

Figure 7-25: C+Meter Date and Model Code Location



Service Tips

- Purge air from the system before performing calibration. Air in the system will affect accuracy of the calibration. Refer to “Purging Air from the System” on page 7-7 for details.
- Place the approved pan under the meter during repair to collect residual fuel.
- Replacing the top quad ring requires use of a special tool that is included with the replacement seal kit. This tool protects the new seal during installation over the drive pin cross hole in the shaft.
- Usually, it is not cost effective to rebuild a meter. If the meter exhibits problems, install a new meter.
- Remove and replace the meter using metric tools.
- Inspect all gaskets during off unit repairs. Replace as needed.
- Some meter bolts are difficult to access. A 13 mm universal socket will make installation and removal easier.
- For calibration problems, refer to “Calibration” on page 7-21.
- After a drive-off, inspect the meter for leaks.
- Non-use of filters and strainers can significantly reduce meter life.
- Abnormally low pressure and flow rates can cause meter to stall.
- Meter failure may be indicated by a significant change in calibration from high to low flow rates (excessive calibration spread), or meter stall at low flow.
  Note:Other problems may also cause the same symptoms.
- Calibration problems are not always caused by a bad meter. Meter check valves, leaking nozzles, binding pulsers, defective pistons, or internally leaking vapor recovery hoses can also result in calibration problems.

C+ Meter Seepage (SB1441)

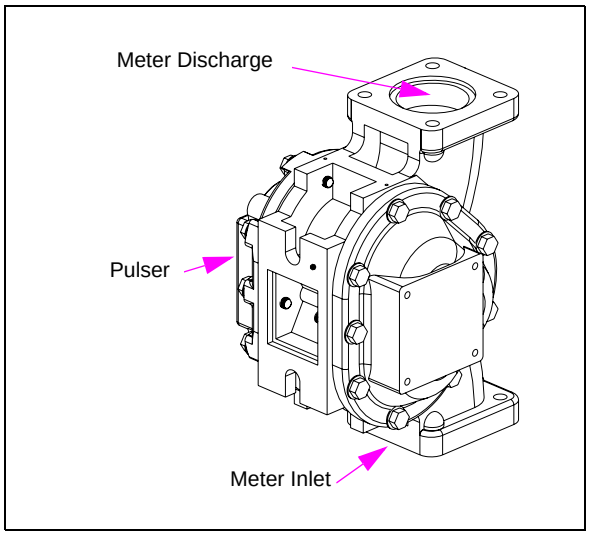
Current seals used in the C and C+ meter are capable of handling very low temperatures. However, some sites have noted seepage at -15 degrees Fahrenheit or colder. If sites with C or C+ meters in your area have experienced extreme cold weather seepage at the shaft seals, the units may be fixed by using special seals developed for extremely cold areas. Depending upon fuels, meter tolerances, and other factors, some meters will require special seals. It is generally only necessary to use the special seals where seepage is noted to occur when temperatures are extremely low (approximately -15 degrees F or colder). Monthly leak inspections of the dispenser hydraulics will catch any leaks that should develop.

The cold weather meter seal kit is K35222-01. The standard seal kit is K35222. The standard kit is considerably less costly than the -01 kit. Also, the standard kit is completely acceptable for even very cold sites. Hence, use of cold weather seal kits across the board is not recommended. One kit services ten meters.

LC Meter (Encore Ultra-Hi)

LC meters are used in Encore Ultra-Hi Master or Ultra-Hi Combo series units.

Figure 7-26: LC Meter and Pulser Assembly



Service Tips

- Remove and replace meter using metric tools.
- Place approved pan under meter during repair to collect residual fuel.
- Inspect all gaskets during off unit repairs. Replace as needed.
- Some meter bolts are difficult to access. A 13 mm universal socket will make installation and removal easier.
- For calibration problems, refer to “About Calibrating Meters” on page 7-21.
- Non-use of filters and strainers can significantly reduce meter life.
- Meter failure may be indicated by a significant change in calibration from high to low flow rates (excessive calibration spread), or meter stall at low flow.
  Note:Other problems may also cause the same symptoms.
- Calibration problems are not always caused by meters; dispenser check valves and leaking nozzles may also cause calibration problems.

Pulsers

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Topics in this Sub-section

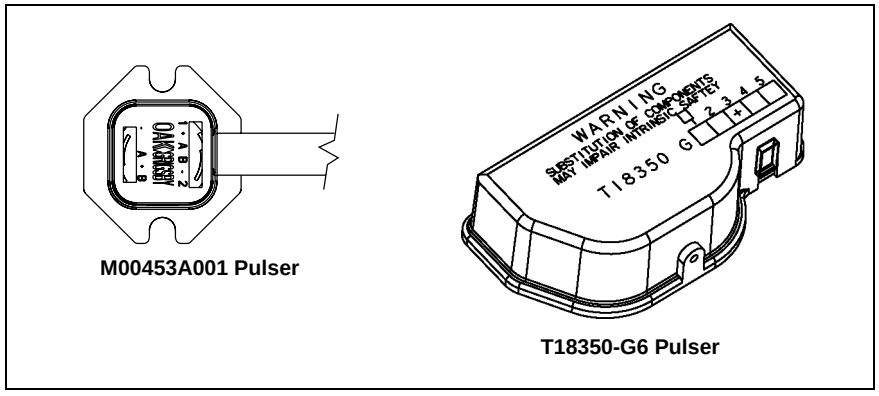
Topic	Page
About Pulsers	7-46
Testing Pulsers and IS Barriers	7-46
Pulser Drive Assembly	7-47

About Pulsers

Pulsers convert meter rotation to pulses per gallon (or liter) for use in some units by the controller board. You can program the unit to scale pulses for specific applications. For example, standard gallonage units use 1000 pulses per gallon. Refer to "Pump Programming" on page 5-1 of this manual for other conversion factors.

Earlier, Encore 500 units used a pulser (M00453A001) which was replaced with an Encore 300 style pulser (T18350-G6) in September 2002. The M00453A001 pulser will continue to be available as a replacement part. The minimum version of Pump Control Node (PCN) software required to support the T18350-G6 pulser is V1.6.00. The Eclipse will continue to use the M00453A001 pulser. Ultra-Hi units use the T18350-G6 pulser.

Figure 7-27: Pulser Assemblies



M00453A001 Pulser

T18350-G6 Pulser

Testing Pulsers and IS Barriers

Voltage is limited to 12 VDC in the pulser. An IS (Intrinsic Safety) Barrier is used to limit current.

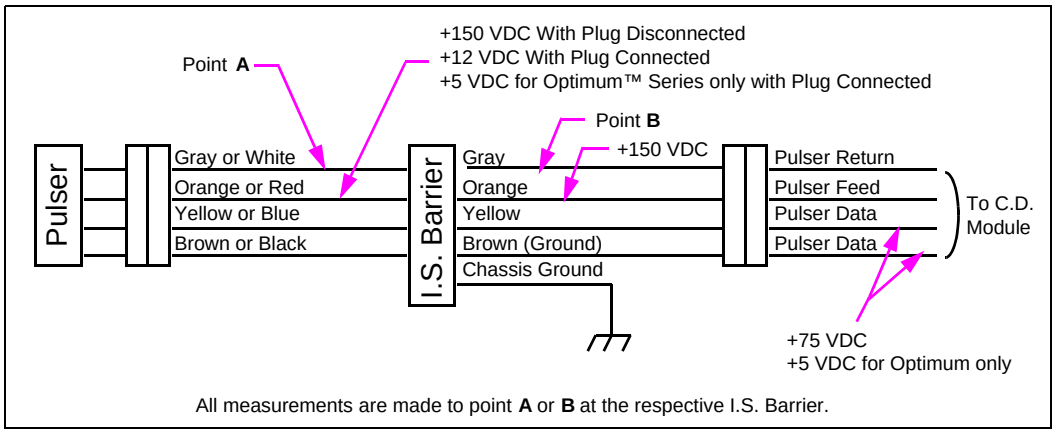
Test the pulser by substitution:

- Unplug pulser and plug a known good one in.
- Rotate pulser and watch displays for count.

Test the IS barrier by substitution or disconnect it and check it with an ohmmeter.

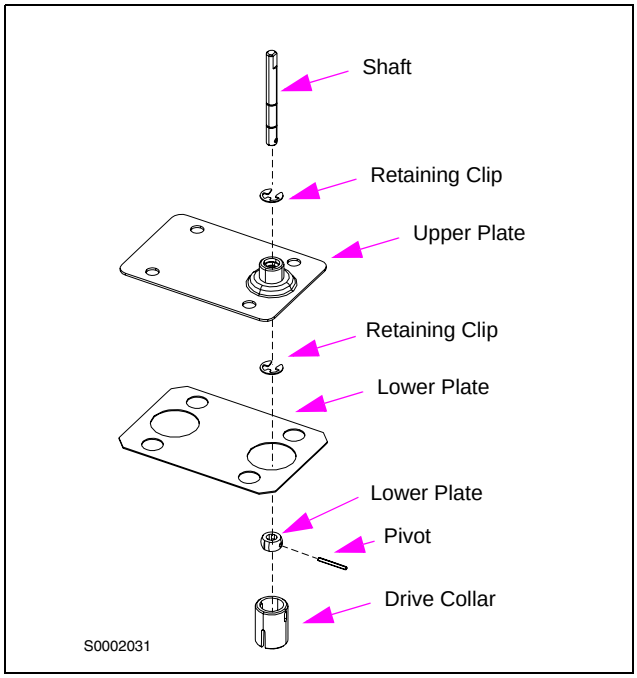
- Measure 10,000 ohms + or - 20% from gray to gray, yellow to yellow, brown to brown, and orange to orange.
- Always read a low resistance from the green wire to the case.
- Measure between each wire. Meter should indicate an open.

Figure 7-28: Pulser and I.S. Barrier Test Points



Pulser Drive Assembly

Figure 7-29: Pulser Drive Assembly



Special Note for Canadian Installations

An O-Ring is used on the shaft in Canadian installations. If squealing is noted, lubricate with silicone grease. When replacing a meter, align lower drive collar to meter shaft to reduce the potential for binding.

Service Tips

- During shipment, T18350-G6 pulsers are restrained by a tie-wrap and should be removed during installation. If a tie-wrap is discovered on the pulser during service, it should be removed. A tie-wrap left in place can result in binding of the pulser shaft.
- Inconsistent communication with the M00453A001 pulser will usually indicate a defective pulser, if the unit had been programmed and calibrated properly.
- Event Logs can be used to pinpoint a specific pulser while troubleshooting pulser errors such as 20, 5047, 5049 and 5050. Pulsers locations are designated by ePulserX. Refer to the following table to determine the location of the pulser.

Pulser Name	Signifies This Side Of Unit	At This Product Pulser
ePulser1	1	1
ePulser2	1	2
ePulser3	1	3
ePulser4	1	4
ePulser5	2	1
ePulser6	2	2
ePulser7	2	3
ePulser8	2	4

Pulser Fail (SB1470)

Error code 20 (pulser fail) has been enhanced to further aid troubleshooting. The software has been modified to display only the pulsers affected by the error code in the PPU displays. The error code can now also be cleared by just lowering the pump handle. Previously, error code 20 would display in all PPU displays and a warmstart was required to clear the error code.

Pulser Rotation Error (SB1451)

The M04012B001 pulser currently “learns” its correct rotational direction by monitoring the first 20 pulses every time the dispenser is powered up. Should the pulser replace an existing pulser and it turn (or be turned) in the wrong direction for the first 20 pulses or more after power up of a unit, it will establish that rotational direction as being correct. The subsequent delivery will result in an error code 5047. To avoid this, do not assemble or rotate a “live” pulser in the wrong direction just after replacement or power up. If the pulser is inadvertently rotated incorrectly, you can simply correct the condition by powering the unit down and back up and ensuring that the pulser turns in the proper direction for the first 20 pulses. Software changes are being investigated to prevent this minor potential problem (eliminate the need to learn rotational direction), and you will be notified of any new software release.

Pulser Interchangeability (SB1451)

The M04012B001 pulser is backward compatible with the old pulser and vice-versa. However, certain important error code information will not be provided if the new design is replaced with the old. Therefore, new pulsers should always be used to service new pulsers except in a case of an emergency situation where it is not available. The pulser is similar in internal design to those used for Eclipse units, but is not interchangeable with Eclipse pulsers. As the pulser is of quadrature design, it can used to reliably detect reverse flow, such as for a blender when a meter check valve is bad. Error code 5047 will occur if reverse flow is detected. For service, the pulser can be used with T18350-G6 pulsers in the same unit, as long as pulsers are replaced as pairs.

The T18350-G6 pulsers are still being used for the Encore 300.

Pumping Device - GDP

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Topics in this Sub-section

Topic	Page
About the GDP	7-49
General GDP Service Procedures	7-50
Draining the GDP	7-50
Strainer/Check Valve Service	7-52
Pressure Control Valve Service	7-54

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing parts and fittings.

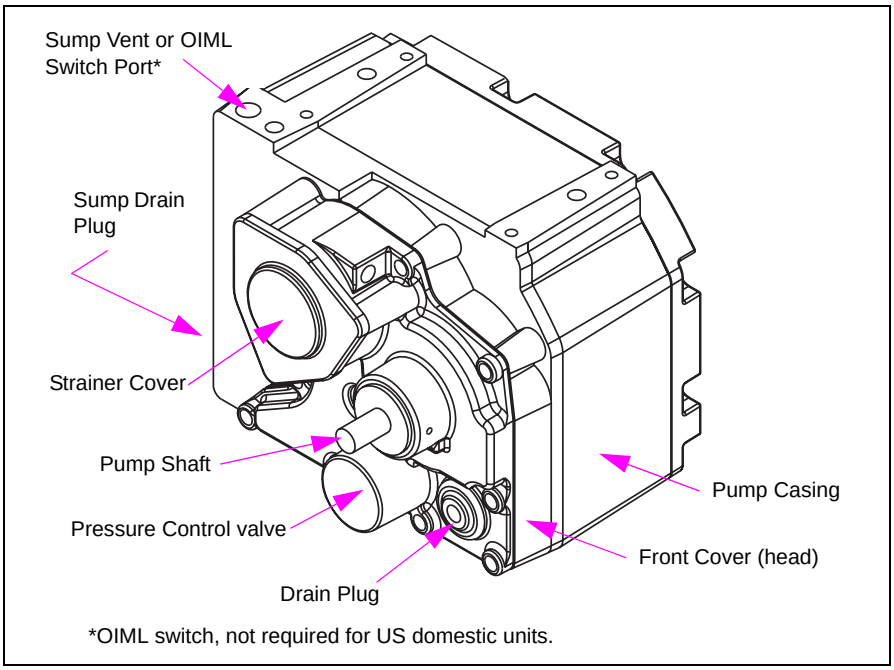
Fire and explosion could result in severe injury or death.

- Wear eye protection.
- Remove parts and fittings slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

About the GDP

Self contained Encore pumps use the Blackmer Global Dispenser Pump (GDP). Service on the pump should be performed in the shop and not attempted in the field. The case is made of aluminum and sealing surfaces may be damaged while working on an inappropriate surface. For additional information about the GDP unit, refer to MDE-4096 Blackmer Global Dispenser Pump Service and Kit Manual.

Figure 7-30: GDP Assembly



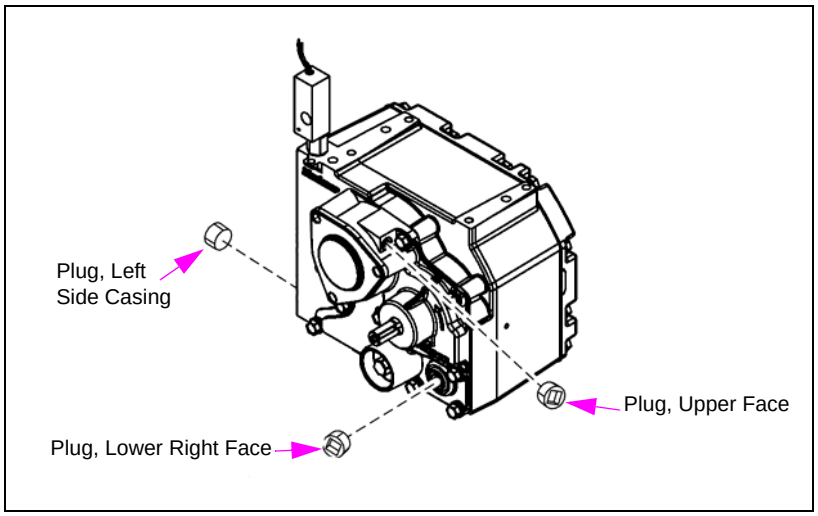
General GDP Service Procedures

This service manual contains basic service procedures for the GDP unit. For additional GDP service information, refer to MDE-4096 Blackmer Global Dispenser Pump Operation, Maintenance and Kit Installation Manual.

Draining the GDP

Draining the GDP unit to some extent will be necessary when opening the unit for servicing the strainer or removing pressure valve.

Figure 7-31: Plug Locations



The following procedure provides instructions on how to drain the bulk of the fluid from the pump.
Note: Residual fluid may remain in the pump.

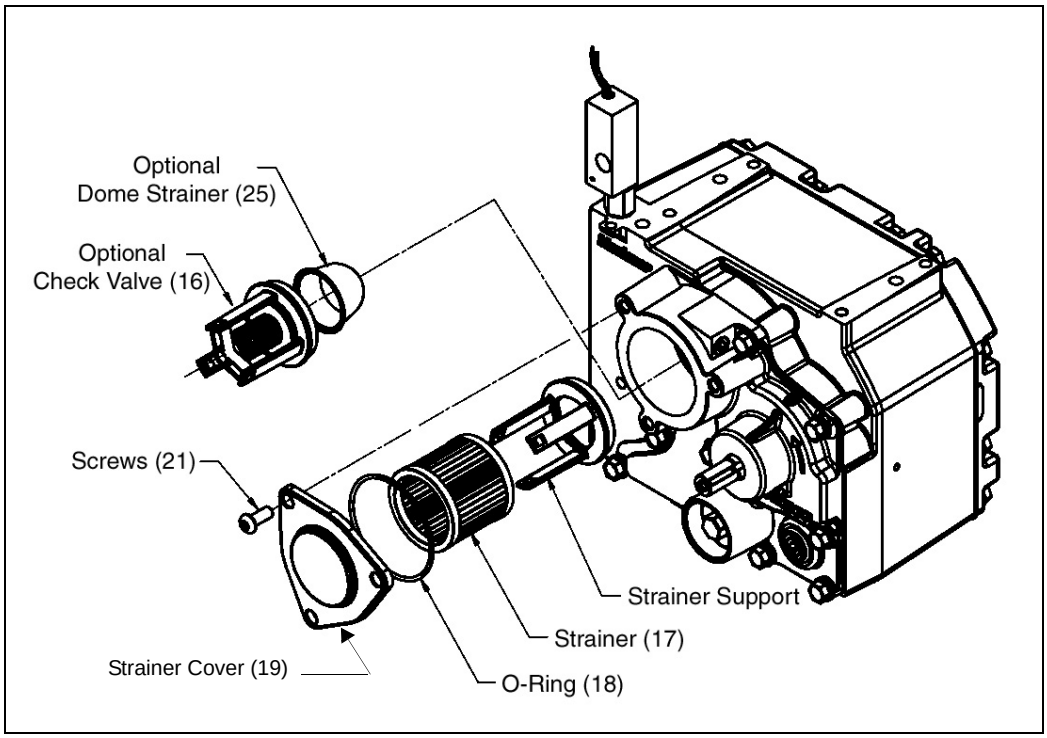
1. Put approved tray in place to catch fuel.
2. Remove the plug on the upper face of head, directly to the right of the strainer cover. This port may be used to monitor vacuum (see Figure 7-31 on page 7-50).
3. Remove the plug on the lower right face of the head. Fluid will be emptied by removing this plug. Fluid must be properly contained during draining procedure.
4. Pump contains up to 0.5 liters of fluid. Do NOT use this port to monitor system pressure.
5. If sump drainage is desired, the plug near the mounting hole on the left side of the pump casing may be removed.
6. Manually turn the pump pulley counterclockwise to aid in fluid removal.
7. Properly dispose of all fluid drained from pump.
8. After pump is drained, replace all plugs using a non-hardening pipe sealant suitable for type fluids being used.
Note: Do NOT use teflon tape.

Strainer/Check Valve Service

Strainer/Check Valve Removal

Check valves (if equipped) should be replaced only if the pump is experiencing frequent loss of prime, indicating that the check valve is not functioning. Check valve should be installed when tank check valve is not available. Always use strainers with or without check valves. Strainer must be kept clean to ensure proper operation and pump life.

Figure 7-32: Strainer/Check Valve



To remove the strainer/check valve, proceed as follows:

Note: The numbers within parenthesis in the procedural steps below refer to the numbers in Figure 7-32 above.

1. Lower pump fluid level by removing the plug located at the right of the strainer cover and rotating the pump shaft counterclockwise approximately ten turns.
   Note: Removing the plug allows air to enter.
2. Remove the three strainer cover screws (see Figure 7-32).
3. Remove the strainer cover. Inspect cover O-Ring (18) for damage. If damaged, discard O-Ring and replace with new O-Ring.
4. Carefully pull out strainer (17). Keep strainer in a horizontal position to avoid contaminating pump with strainer debris. It may be necessary to use a small tool to gently hook the inside of the metal strainer end cap.
5. If equipped, remove the inlet check valve assembly (16). Inspect for cracked or otherwise damaged O-Rings. Replace if damaged.
6. Lift dome strainer (25) out from the bore located behind the check valve assembly. Inspect strainer for damage. Clean and replace, if necessary.

Strainer/Check Valve Installation

To install the strainer/check valve, proceed as follows:

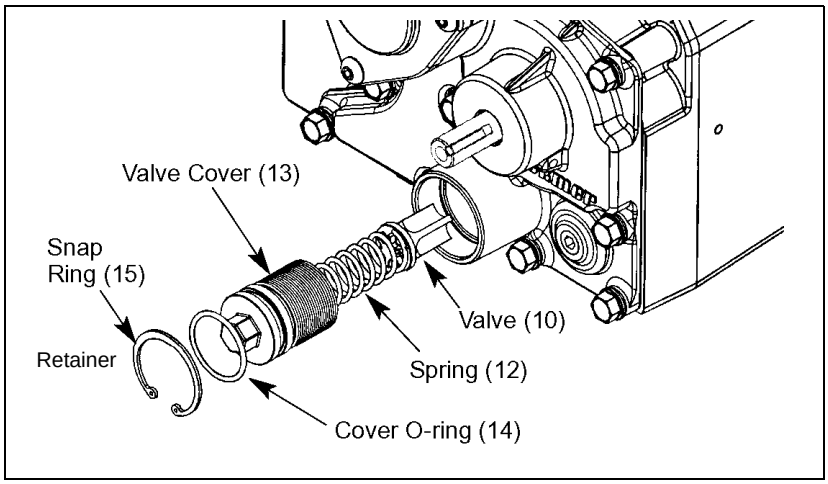
Note: The numbers within parenthesis in the procedural steps below refer to the numbers in Figure 7-32 on page 7-52.

1. If equipped with check valve option, insert dome strainer (25) into bore.
2. Clean debris from check valve, especially at the O-Ring seats.
3. Lubricate O-Ring before installing check valve assembly.
4. Insert check valve assembly (16) or strainer support (30) into corresponding pump bore as shown (see Figure 7-32 on page 7-52). Press assembly squarely over receiving cylindrical surface until O-Ring sits firmly over the surface and holds the assembly in position.
5. Insert new or cleaned strainer (17) into bore over check valve assembly.
6. Clean debris from strainer cover O-Ring groove and install O-Ring (18). If O-Ring does not stay in place, use a small amount of all purpose grease to hold the O-Ring in the groove.
7. Install strainer cover (19) with screws (21). Hand tighten, alternating between each screw to keep the cover parallel to the casing face. Torque the screws to 150 lbs-in (17 Nm). Do NOT overtighten. Overtightening may cause damage to screw or casing.
8. Replace the plug (11) in the hole located to the right of the strainer cover.

Pressure Control Valve Service

Pressure Control Valve Removal

Figure 7-33: Pressure Control Valve



CAUTION

Excessive wear on the Pressure Control Valve (PCV) can cause improper pump performance, including flow loss or excessive or low discharge pressure.

To remove the PCV, proceed as follows:

Note: The numbers within parenthesis in the procedural steps below refer to the numbers in Figure 7-33 above.

CAUTION

Adjusting valve pressure beyond factory specifications to increase flow rates can result in premature motor failure or pump wear not covered by warranty.

1. Drain the pump following the procedure outlined under "Draining the GDP" on page 7-50.
2. Remove the snap ring (15). Refer to Figure 7-33 above.
3. Using a 16 mm socket wrench, turn the valve cover (13) outward or counterclockwise until completely removed.
4. Remove the spring (12) and valve (10).
5. If valve did not come out with the spring, use needle nose pliers to remove it from the bore.

Pressure Control Valve Installation

To install PCV, proceed as follows:

Note: The numbers within parenthesis in the procedural steps below refer to the numbers in Figure 7-33 on page 7-54.

.

IMPORTANT INFORMATION

Modification of pressure control valve or failure to correctly install all components of the pressure control valve will void any regulating agency recognition applicable to this pump.

1 Inspect valve (10) for damage or excessive wear. Replace if necessary.

2 Install PCV in reverse order of removal (see Figure 7-33 on page 7-54).

3 Apply a light coating of grease on the cover O-Ring (14) to help keep the O-Ring from being damaged during installation.

4 When pump is operating at full speed, discharge pressure must NOT exceed 50 PSI (3.5 Bar) with any discharge restriction (fully open to fully close discharge). If the pressure exceeds 50 PSI (3.5 Bar), see Figure 7-33 on page 7-54.

Pressure Control Valve Adjustment

PCVs must be set to the desired single hose operation pressure. A retaining ring must be in place at all times during pressure control valve adjustment.

⚠ WARNING

Not using a retaining ring can release hazardous pressure that can cause personal injury or property damage.

Always ensure that the retaining ring is in place before adjusting the PCV.

Take appropriate safety precautions. If not, personal injury or property damage may occur.

To set the PCV operation pressure, proceed as follows:

1 To increase the pressure setting, turn the PCV cover (13) inward or clockwise using a 16 mm socket wrench. See Figure 7-33 on page 7-54.

2 To decrease the pressure setting, turn the PCV cover (13) outward or counterclockwise using a 16 mm socket wrench.

Pump Device Motor

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

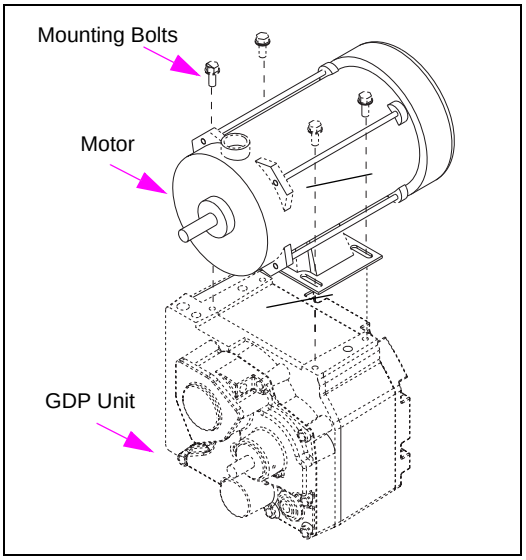
Contents in this Sub-section

Topic	Page
About Electric Motor for Self Contained Pump Units	7-56
Belts and Pulleys	7-57

About Electric Motor for Self Contained Pump Units

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual.

Figure 7-34: Motor for GDP pump



Thermal Overload

Most motors have a thermal overload switch, that opens the circuit automatically, if the motor is drawing excessive current or overheats. When the switch cools, it activates and turns the motor back on. Motors do not require a manual reset. The 220/380 VAC motors do not have a thermal overload switch.

If overload shutoff occurs frequently:

- Check voltage switch for proper voltage selection (220/230/240/380).
- Check for free pump and motor shaft rotation.
- Check pump bypass valve and relief pressure setting.
- Check belt tension.
- Check line voltage during operation, with nozzle closed and then open. Low or high voltages (greater than +/- 10%) can cause overheating or premature failure.
- Only use Gilbarco specified explosion-proof motor for replacement. NFPA requires explosion-proof motors.

Belts and Pulleys

Inspecting Pulleys and Belts

Check every time you inspect or change belts. Replace if these conditions exist:

- Excessive wear in pulley grooves in pulleys or belts, excessive pulley-to-shaft clearance or excessive bearing play.
- Cracks, and so on.
- Frayed belts or excessively worn belts.

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Use OSHA Tag-out and Lock-out procedures.

⚠ WARNING

Belts and pulleys can pinch fingers and hands.

Injuries may result. Avoid placing fingers or hands between belts and pulley.

Never turn power on to fit belt on pulley.

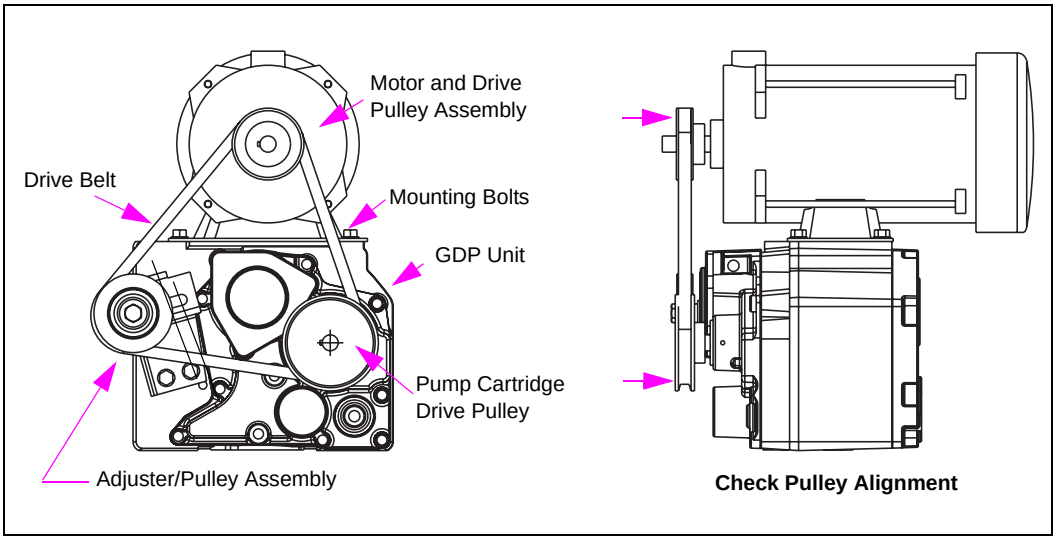
Setting Belt Tension

Tighter belt tensions can cause both pump and motor bearing wear and premature failures. Loose belts result in low flow or pulley/belt failures or noise. Use the following rating:

45-55 lbs (200-240 Newtons).

Do not run motor to install belt. Belt will be tight during assembly. This is normal. Some belts have arrows marked on them showing direction of rotation. When replacing belts, ensure that the arrow points in the direction of rotation.

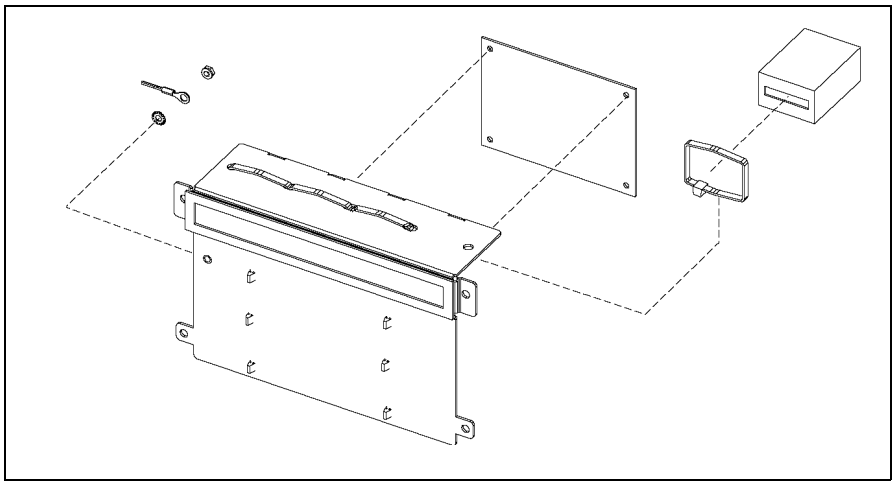
Figure 7-35: Motor and Pump Pulley Assembly



Totalizers

Read and follow all safety precautions as outlined in “Read this First” on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Figure 7-36: Electronic Totalizer Assembly



Service Tips

- Encore and Eclipse totalizers can be set to operate per product inlet, per unit or per side.
- Programming of jump-jacks is required to set functionality.
- Certain problems can be indicated by error codes.

Valves

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Contents in this Sub-section

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Check Valves at Manifold and Meter	7-59
Digital Valve	7-61
Proportional Control Valve	7-63
Shear Valves	7-66
Solenoid Valves	7-67
Steering Valves	7-68
Vapor Valve (Vapor Vac)	7-68

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing parts and fittings.

Fire and explosion could result in severe injury or death.

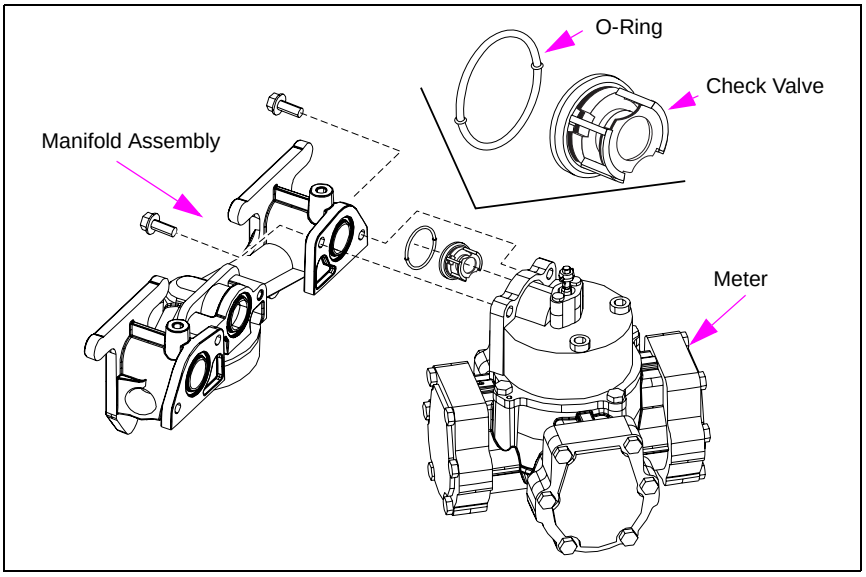
- Wear eye protection.
- Remove parts and fittings slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

Flow control valves regulate the flow rate and blend ratio if applicable. The Encore and Eclipse models may be outfitted with digital valves or PCVs. These valves and manifolds are not interchangeable and must be used with specific components such as air gap plates, manifold and electronics. The proportional flow control valve can be programmed for flow control for blenders. Non use of filters and strainers can cause premature valve failures.

Check Valves at Manifold and Meter

Meter pressure check valves help keep the meter full of fuel. They also help relieve excessive pressure due to thermal expansion that could damage parts or make nozzles difficult to open. For blending, they also prevent crossover flow from tank-to-tank. The check valves are located in the meter intake port.

Figure 7-37: Check to Meter Orientation



Some Potential Problems:

- Damage to hydraulic parts can occur from thermal expansion, or driving over a hose, if valve is inoperative.
- If valve sticks open, a sale may register when you first turn the nozzle hook ON with nozzle closed. (Also, check STP check valve for problems)
- Blend error codes indicating product contamination.
- Stuck valve causing reduced flow rates
- Leaks
- Calibration problems

Service Steps

- Check valves are not rebuildable; replace any defective check valves.
- Wear eye protection, for this process.

1 Close and test shear valves (for dispensers).

2 Remove power to unit and involved STPs. Use OSHA Lock-out/Tag-out procedure.

3 Open nozzle into approved container to bleed pressure. Some residual pressure may remain.

4 Use Gilbarco repair kit to replace check valve.

5 Inspect metallic seat of valve body for damage or uneven seating surface.

6 Clean contamination from valve body interior when servicing.

7 Torque bolts properly. Refer to “Torque Specifications” on page 7-5.

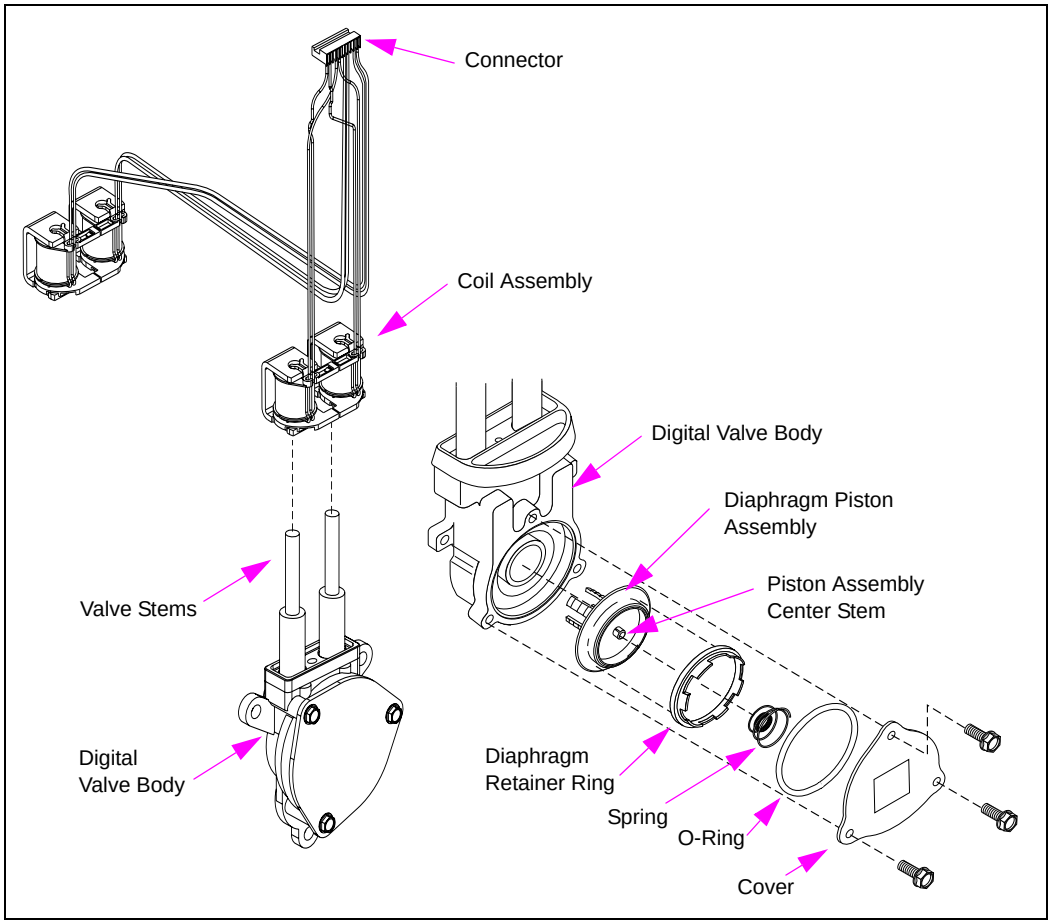
8 Follow the steps in “After Repairing” on page 7-4.

Digital Valve

The digital valve consists of a casting, a diaphragm, piston assembly and two pilot control valves with electromagnetic actuation coils. Fuel flow is controlled by signals actuating the coils that open and close the pilot control valves. The digital valve allows for precise control of fuel blends by regulating the movement in small increments of a diaphragm piston assembly. The opening/closing of the pilot control valves are continuously monitored and adjusted to maintain blend ratios. For non-blenders, the valve operates at only slow and fast flow. For more detailed information on how the digital valve works, refer to "Theory of Operation and Troubleshooting" on page 8-1.

Note: Digital valves cannot be used for programmable flow control.

Figure 7-38: Digital Valve Assembly



Some Potential Problems:

- Coils improperly installed (upside down) can result in improper valve operation
- Retaining hardware placed incorrectly or damaged
- Excessive buzzing
- Error codes
- Leaks, internal (bypass) and external
- Coil activation handle switch if bracket is not used
- Preset overrun/underrun
- No or low flow
- Very cold weather leaks (solved by using a special valve kit)

Service Steps - Disassembling Digital Valve

Determine if problem is with coil or valve assembly. Only valve assembly service requires opening the fuel system. The instructions below pertain to diaphragm replacement. This is usually done to solve problems with valve noise, internal leaks (bypass) and flow problems. Depending upon labor rates in your area, it may be less expensive to replace as opposed to rebuilding the valve.
Note: Other components can cause similar symptoms.

To disassemble the digital valve, proceed as follows:

1. Using approved containers, absorbent materials and practices, prepare for any residual fuel and pressure that may be in valve.
2. Close shear valves involved and verify proper operation (dispensers only).
3. Remove power from the unit and any associated STPs at circuit breakers. Follow OSHA Lock-out and Tag-out procedures.
4. While being careful of any residual pressure and fuel spray, slowly remove three Hex bolts from diaphragm assembly cover and remove cover. Wear eye protection. Save cover and bolts.
5. Use Gilbarco kit K96621 to service valve.
6. Remove existing O-Ring and discard.
7. Remove spring from center of diaphragm piston assembly. Spring is snapped onto center stem of diaphragm piston assembly.
8. Remove diaphragm retainer ring.
9. Retainer ring is not threaded; it is pressed in place. Removal may require use of channel lock pliers and a screwdriver to pry retainer ring loose. Use tools carefully to avoid damage to digital valve body.
10. Grasp outer edge of plastic piston cup with needle nose pliers and pull to remove diaphragm piston assembly.
Note: Suction within digital valve body may cause resistance during removal.

Replacing Digital Valve Parts

Follow kit instructions to install new parts. Reverse disassembly procedure to reinstall existing parts. Test for proper operation and leaks after rebuilding the valve.

Service Tips

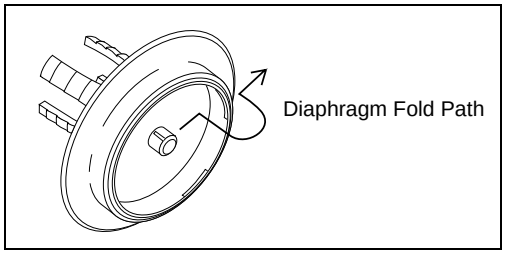
- When servicing the diaphragm assembly, ensure that diaphragm is positioned correctly on piston. If necessary, gently roll diaphragm over to follow path shown in Figure 7-39. Diaphragm may have unfolded during shipping.
- Ensure that all parts are clean. Introduction of contamination can cause faulty operation or premature failure of the valve.
- Replace all parts as provided when rebuilding the valve as some parts have design enhancements.
- Retainer ring is not threaded, it is pressed in place. Use tools carefully to avoid damage to digital valve body.

Digital Valve Seepage (SB1447)

Current seals used in the digital valve are capable of handling very low temperatures. However, some sites have noted seepage at -15 degrees Fahrenheit or colder. If sites with digital valves in your area have experienced extreme cold weather seepage at the valve seals, the units can be fixed by using special seals and a new valve cover developed for extremely cold areas. Depending upon fuels, tolerances, and other factors, some valves will require this special kit. It is generally only necessary to use the special kit where seepage is noted to occur when temperatures are extremely low (approximately -15 degrees F or colder). Monthly leak inspections of the dispenser hydraulics will detect any leaks that may develop.

The cold weather digital valve seal kit is K94444-05. The standard seal kit is K94444-03. The standard kit is considerably less costly than the -05 kit. Also, the standard kit is completely acceptable for even cold sites. Hence, use of the cold weather seal kits across the board is not recommended. For additional information, refer to MDE-4242 The Advantage/Encore/Eclipse Digital Valve Rebuild Kit.

Figure 7-39: Proper Diaphragm Fold



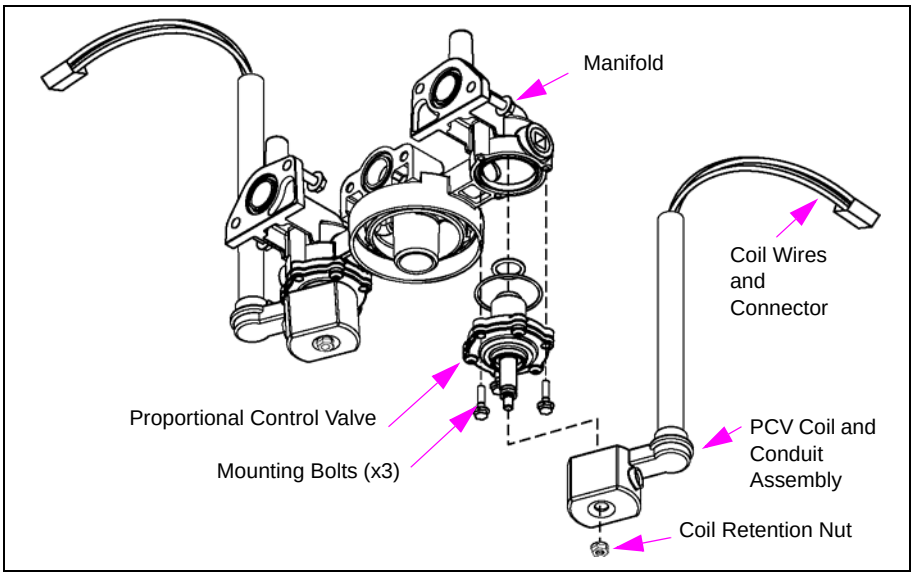
Proportional Control Valve

The Gilbarco PCV uses an analog signal to control flow. This feature provides smooth and quiet operation. Coils and conduit are a combined unit and are easily replaced. For detailed information on how the proportional control valve works, refer to “Theory of Operation and Troubleshooting” on page 8-1.

Some Potential Problems:

- Excessive noise
- Error codes
- Leads external and bypass
- Preset overrun or underrun
- No flow or low flow
- Flow hesitation

Figure 7-40: Proportional Control Valve Assembly



Service Steps - Replacing Proportional Control Valve Assembly

Determine if problem is with coil or valve assembly. Only valve assembly service requires opening the fuel system. The instructions below pertain to valve replacement. This is usually done to solve problems with valve noise, internal leaks (bypass) and flow problems.

Note: Other components can cause similar symptoms.

To replace the proportional control valve assembly, proceed as follows:

1. Using approved containers, absorbent materials and practices, prepare for any residual fuel and pressure that may be in valve.

2. For dispensers, close the shear valves involved and verify proper operation.

3. Remove power from the unit and any associated STPs at circuit breakers. Follow OSHA Lock-out and Tag-out procedures.

4. While being careful of any residual pressure and fuel spray, slowly remove three Hex bolts from diaphragm assembly and remove. Do not remove pan head bolts that require special tools. Wear eye protection. Save bolts.
   Note: The internal parts of the PCV are not serviceable.

5. Remove existing O-Rings and discard.

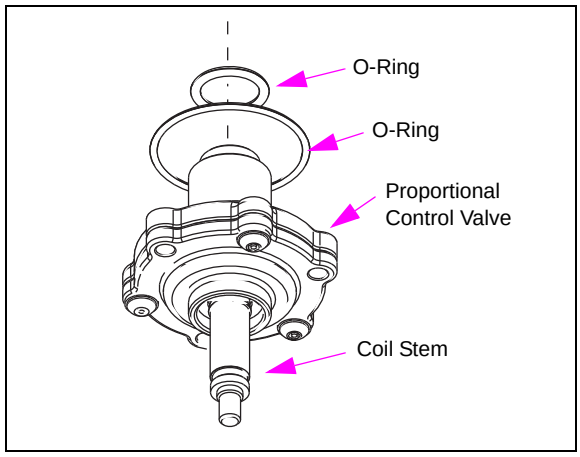
6. Install new O-Rings (see Figure 7-41). Use Gilbarco kit K96621-0X.

Replacing Proportional Control Valve Parts

To replace the proportional control valve parts, proceed as follows:

1. Reverse disassembly procedure to install the valve.
2. Torque the three Hex bolts to 100 inch pounds.
3. Test for proper operation and leaks after installing valve.

Figure 7-41: Proportional Control Valve Assembly



Service Tips

- Ensure that the coil is installed properly.
- Do not pry on coils.
- No flow or other valve problems may be caused by a bad valve coil, valve adaptor, or pump control node board. Do not rebuild or replace the valve without checking these first.

Shear Valves

Shear valves have a section of the valve that is designed to break from a sufficient impact to the unit. Shear valves cut off the flow of fuel from product piping if impact or fire causes shear valve linkage to trip. Single poppet shear valves only stop fuel at the product piping. Double poppet shear valves also stop fuel from draining out of dispenser.

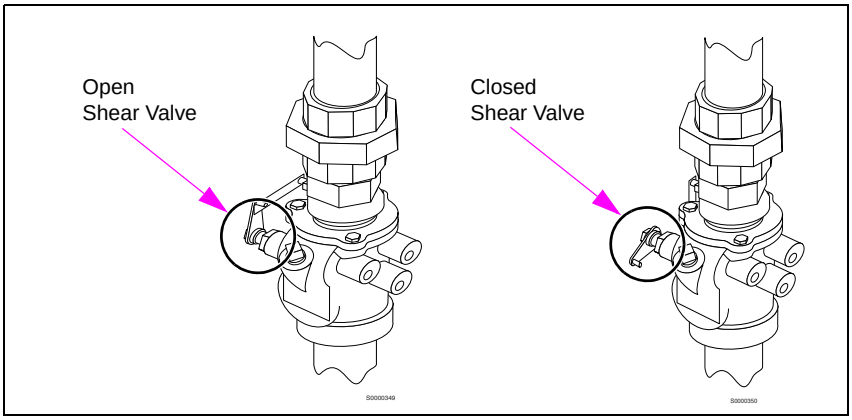
CAUTION

Improper wrench technique may damage the shear valve and lead to leaks. Excessive force applied to shear valve during fitting and tightening may damage or weaken shear section of valve. Always use two wrenches - one wrench to hold valve above the shear line and the other to apply force to fitting.

UL requires all dispensers to use shear valves. Follow these recommendations when installing or servicing shear valves:

- Ensure free movement of linkage.
- Lubricate valve linkage per manufacturer's instructions.
- Follow manufacturer's recommendations first when installing valves.
- Shear section of valves must be flush with top of islands.
- Do not mount valve upside down.
- Anchor shear valves rigidly. Rigid cross member and mountings are important devices for proper operation of the system.
- Inspect valves every six months. Ensure that valve linkage is free and clear from any obstructions (conduit, piping, and so on). Lubricate the linkage with SAE 10W motor oil.
- Gilbarco highly recommends use of double poppet shear valve instead of single poppet when replacing valves. Use of double poppet shear valves may require some internal plumbing changes for older units. Double poppet shear valves prevent fuel from draining from a unit that has been knocked off the island.
- Do not use pliers to open or close shear valves. Reduce pressure if valve does not open easily. Refer to shear valve manufacturer's instructions for proper tools and procedures.

Figure 7-42: Typical Shear Valve Linkage



Inspecting Shear Valves

⚠ WARNING

Always confirm proper operation of shear valve prior to performing hydraulic service that requires shear valve to be closed. In some instances, a shear valve may outwardly appear closed but could actually be open.

To inspect shear valves, proceed as follows:

1. Authorize hose at console as required.
2. Lift operating handle.
3. Place discharge nozzle in approved container.
4. Squeeze nozzle operating lever. If flow continues after several seconds, valve is defective.
5. Repair or replace valve.
6. After testing, place a few drops of SAE 10W motor oil or equivalent on valve body shaft. Open and close valve by hand several times. Place valve back in service.

Solenoid Valves

Solenoid valves use a solenoid coil to open or close a valve. Valves of this type are either fully open or closed. Servicing is relatively simple consisting mainly of replacing the coil, the valve body or the board supplying voltage to the valve.

Solenoid valves are usually associated with:
- VaporVac valves
- Steering valves
- Ultra-Hi valves

Rebuilding or Replacing

Labor cost for your area may determine your service philosophy. High labor costs favor replacement. Difficult removal from unit favors partial rebuild in unit. Gilbarco recommends the following services for average or lower than average labor costs.

For Valves	Recommended Service
Less than two years old	Use a repair kit (replace spring, diaphragm, and O-Rings)
More than two years old or high usage	Replace the valve.

To rebuild or replace solenoid valves, proceed as follows:

1. Close and test shear valves (for dispensers).
2. Remove power to unit. For dispensers, remove any involved STPs. Use OSHA Lock-out/Tag-out procedure.
3. Open nozzle into approved container to bleed pressure. Some residual pressure may remain.

4 Check disconnected valve coils for continuity; if bad, replace coil.

5 Replace valves if defective. Use UL-approved sealant as required for fuels when replacing valves. Do not use teflon tape (teflon tape debris may cause the valve to malfunction). Clean valve area. Do not introduce contamination into valve or piping. Install valves with flow arrow pointing in the proper direction.

Service Tips

If no magnetic field or power exists, the likely problem is:

- Problem with power from the valve driver board
- A cable problem

If power exists, the problem may reside in:

- Coil
- Valve body

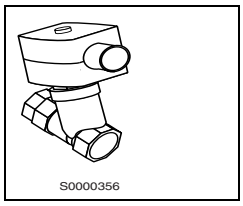
Steering Valves

Steering valves are used on multi-hose blenders. These valves are part of the steering valve manifold and are used to direct fuel flow to the proper hose. The valves ensure that only the proper hose is activated. Refer to “Steering Manifold” on page 7-38 for information on Steering Valves.

Vapor Valve (Vapor Vac)

Vapor valves mount in the upper piping housing assembly. Refer to “Vapor Recovery Components” on page 7-69 for additional VaporVac Information. Vapor valves that do not operate properly can cause loss of vapor recovery system efficiency or premature nozzle cut-off (especially in Balanced Vapor Recovery systems). They are single-stage solenoid valves that isolate all hoses not in use.

Figure 7-43: Vapor Valve T17909



Note: New units do not use vapor valves. They require a particular type of nozzle which is different from units containing vapor valves. Ensure that you use the correct nozzle type (refer to manufacturer's instructions) for the application, or “clean air regulations” may not be met.

Service Tip

Under normal operating conditions, vapor valves make a clicking sound when flow begins. However, a defective valve can make the VaporVac pump/motor noisier during operation. If the vacuum pump becomes noisier only when a certain hose on a certain side is being used, suspect the valve associated with that hose.

Vapor Recovery Components

Contents in this Sub-section

Topic	Page
VaporVac Assemblies	7-69
Common Vapor Recovery Testing Procedures	7-70
Calibrating VaporVac	7-73
Returning VaporVac Pump/Motor	7-75
ISD Vapor Flow Meter	7-75

Read and follow all safety precautions as outlined in "Read this First" on page 1-1 and related sections of this manual. Consult your local regulatory agency for the proper test procedure.

⚠ WARNING

Residual pressure and entrapped fuel may still be present and may drain or spray when removing parts and fittings.

Fire and explosion could result in severe injury or death.

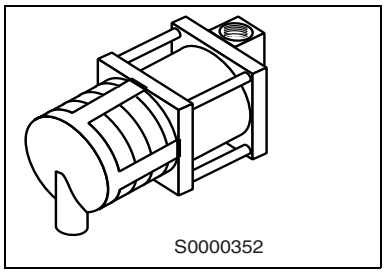
- Wear eye protection.
- Remove parts and fittings slowly. Collect fuel in approved containers.
- Clean up all spills promptly.

VaporVac Assemblies

R19663-G1 and T17942

These assemblies mount in the upper piping housing of the unit on field retrofit units and in the hydraulics cabinet on factory-built VaporVac units. Retrofit units use R19663-G1 with attached connector. Factory-built units use T17942. The VaporVac motor driver board provides 36-50 VDC to operate the motor and 6.2 VDC for the sensors.

Figure 7-44: VaporVac Pump/Motor Assembly



Load Table

Unit	Load
Single-sided	3 A @ 120 VAC
Dual-sided	5 A @ 120 VAC

Wiring

Number	Wire Label (REF)	Color	Min. Wire Length	Gauge	Description
1	CHL	Green	30	22	Hall Effect sensor
2	BHL	Gray	30	22	Hall Effect sensor
3	AHL	Yellow	30	22	Hall Effect sensor
4	PHL	Orange	30	22	Hall Effect sensor
5	GHL	Black	30	22	Hall Effect sensor
6	A WYE	Blue	30	18	Power – motor
7	B WYE	White	30	18	Power – motor
8	C WYE	Brown	30	18	Power – motor

Vapor Valve

Vapor valves mount in the upper piping housing assembly. They are single-stage solenoid valves that isolate all hoses not in use. The VaporVac valve driver board supplies 120 VAC for operation. Refer to "Vapor Valve (Vapor Vac)" on page 7-68 for additional information.

Common Vapor Recovery Testing Procedures

This section contains tests that are frequently used for vapor recovery systems.

Ensure that you consult your local regulatory agency before performing any test on your vapor recovery system. There may be three or four different procedures that exist for each test. Only your local regulatory agency can inform you of their version, provide you with a copy of the test procedure, and provide you with the correct method of reporting test results.

Testing Air-to-Liquid (A/L) Volume with a Pulse Simulator Box

Note: This test is not for certification.

Required materials:

- A/L Test Kit K94255
- Five gallon or larger prover can (for changing failed nozzles)
- Standard and Phillips® screwdriver
- Allen® wrench set
- New spare nozzles to replace any that might fail
- T19343-G1 Pulse simulator

To test the air-to-liquid volume with a pulse simulator box, proceed as follows:

1 Place the dispenser in standalone mode.

2 Install the nozzle testing tee from the K94255 A/L Test Kit. Ensure that you use the (-05 or -07) “no flow” insert in the testing tee.

3 If air volume meter has a mechanical totalizer, record initial value. If air volume meter has electronic output, reset the frequency counter to zero.
Note: Be aware that testing meter can measure a light breeze since there is a very low pressure drop through the meters. Protect testing meter from wind.

4 Ensure that the nozzle hook is in the “OFF” position and the pulse simulator box is set to “Halt”.

5 Unplug the pulser from the cable assembly for the hose position to be tested.

6 Plug the pulse simulator box connector into the cable assembly.

7 Select the flow rate on the pulse simulator box that is closest to the actual dispenser/site flow rate. If the actual flow rate is not known, set the pulse simulator box to 8 GPM.

8 Raise the nozzle hook to authorize the dispenser, and then turn the pulse simulator box to the “Run” position. Do not engage/squeeze the nozzle lever.

9 Switch the pulse simulator box from the “run” position to the “halt” position when the volume display on the dispenser indicates 4.5 ± 0.3 gallons.

10 The following information obtained should be recorded on a data sheet.
- The selected flow rate setting from the pulse simulator box (6, 8, or 10 GPM).
- The actual liquid volume registered.
- The final value on the mechanical totalizer or frequency counter for the air volume meter.

11 Calculate the A/L value for the fueling position that was tested.

12 Refer to CARB Executive Order G-70-150-AD for the VaporVac system. Verify that the dispenser flow rate and A/L value are within the acceptable limits specified.

13 If the A/L values are within the acceptable limits, the vapor recovery system is operating properly and testing should be concluded for that hose position.

14 If the A/L values are not within the acceptable limits, it will be necessary to troubleshoot and possibly calibrate the system.

Testing Pressure Drops (Dynamic Back Pressure)

This test measures the pressure drop or resistance in the vapor recovery piping from the dispenser to the UST. Nitrogen is forced through the vapor recovery piping at various flow rates, while the back pressure, or resistance, is measured with pressure gauges. There are two basic versions of this test. Version 1 is called the "dry" test. Dry refers to testing the piping as is, and assumes there is no fuel in the piping to create a liquid trap. Version 2 is called the "wet" test. Wet refers to pouring fuel into the piping to create liquid traps in any low points.

Balance vapor recovery systems are tested from the nozzle to the UST. Vacuum assist systems, such as VaporVac, are tested from the riser at the base of the dispenser to the UST. The allowable pressure drop for balance vapor recovery systems is listed in the actual test procedure. The allowable pressure drop for vacuum assist systems is listed in the CARB Executive Orders.

Known Test Procedures	Description
CARB TP-201.4	Determination of Dynamic Pressure Performance of Vapor Recovery Systems of Dispensing Facilities
San Diego County APCD TP-91-2	Pressure Drop vs. Flow / Liquid Blockage Test Procedure For Phase II Balance System Installations
TNRCC TXP-103.1	Determination of Dynamic Pressure Performance (Dynamic Back Pressure) of Vapor Recovery Systems at Gasoline Dispensing Facilities
Bay Area AQMD ST-27	Gasoline Dispensing Facility Dynamic Back Pressure

Testing Leaks/Pressure Decay (Static Pressure)

This test evaluates the integrity of the vapor seals of the vapor recovery system components and connections and determines if there are any leaks. The entire vapor recovery system is pressurized with nitrogen to a specified amount. The pressure is then monitored over a specified period of time. The maximum amount of pressure loss or decay is based upon the ullage or vapor space in the UST.

Known Test Procedures	Description
CARB TP-201.3	Determination of Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities
San Diego County APCD TP-91-1	Pressure Decay / Leak Test Procedure For Phase I and II Vapor Recovery Installations
TNRCC TXP-102.1	Determination of Static Pressure Performance (Pressure Decay) of Vapor Recovery Systems at Gasoline Dispensing Facilities
Bay Area AQMD ST-30	Static Pressure Integrity Test For Underground Storage Tanks

Testing Performance (Vacuum Assist Systems)

Read and follow all safety precautions as outlined in the "Read This First" section and in this and related sections of this manual.

This test verifies that the system is working in a manner similar to which it was certified by CARB. There are two basic performance tests for vacuum assist vapor recovery system. Test 1 is the A/L or V/L test. This test simultaneously measures the volume of air being collected by a vapor recovery nozzle and the volume of fuel being dispensed by that nozzle. Test 2, the vacuum test, was developed by Gilbarco. It measures vacuum generated at the nozzle by drawing air through a controlled orifice.

Known Test Procedures	Description
CARB TP-201.5	Determination (by Volume Meter) of Air to Liquid Volume Ration of Vapor Recovery Systems of Dispensing Facilities
Gilbarco MDE-3022	Operating Instructions for Field Performance Test Kit (K94123) for VaporVac
Bay Area AQMD ST-39	Gasoline Dispensing Facilities, Air-Vapor to Liquid Volume Ratio
San Diego County APCD TP-95-2	Vapor to Liquid Ratio at Gasoline Dispensing Facilities Using Vacuum Assist Systems

Testing for Internal Leaks

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Consult your local regulatory agency for the proper test procedure. Use this procedure to quickly test for leaks of fuel into the vapor area. Use this procedure for service, periodic tests, and regulatory agencies.

To test the tank for internal leaks, proceed as follows:

1. Raise the nozzle hook (dispenser handle) to authorize the dispensers, but do not dispense fuel.
2. Observe the gallonage readout on the main display.
3. If a slow and continual readout is noted while the nozzle is closed, a leak may exist at the inner vapor hose or seals.

Calibrating VaporVac

Before calibration, ensure that the following has occurred:

- Visually inspect for leaks, loose pipe connections, and so on.
- Use the K94123 Field Performance Test Kit to test the system.
- Verify that all hanging hardware (for example, hose, nozzle, and breakaway) is in good working condition.

Calibrate the vapor recovery system if:

- A new vapor pump has been installed
- The vacuum level is out of the acceptable range from testing with the field performance test kit and the pulse simulator box.

To calibrate the vapor recovery system, proceed as follows:

1. Place the dispenser in standalone mode.
2. Install a new or known good nozzle on the hose position in question.
3. Install the nozzle testing tee from the K94123 Field Performance Test Kit by following the instructions in MDE-3022 Field Performance Test Kit (K94123) for VaporVac. Ensure that you use the (-05 or -07) "no flow" insert in the testing tee.
4. Hook up the pulse simulator box by following previous instructions in this manual.

5 Select the flow rate on the pulse simulator box that is closest to the actual dispenser/site flow rate. If the actual flow rate is not known, set the pulse simulator box to 8 GPM.

6 Raise the nozzle hook to authorize the dispenser, and then turn the pulse simulator box to the "Run" position. Do not engage/squeeze the nozzle lever.

7 Measure the vacuum level after 3 gallons have registered on the volume display of the dispenser.

8 Adjust the vacuum level by turning the "slope" trim pots (R30 and R52) on the T18021 or T19401 VaporVac Controller board.

Turn Trim Pot Screw	
Clockwise	increases vacuum level
Counter-Clockwise	Decreases vacuum level

9 The vacuum level should be adjusted as specified in the following chart. The vacuum levels in this chart are only valid when using the Q13245-01 orifice plug in the T19454-G1 nozzle testing tee.

GPM	Vacuum Level (Inches of Water)
6	4
8	7
10	10

10 If the vacuum level cannot be adjusted to meet the above values, the vapor pump/motor is bad and must be replaced.

11 If the vacuum level can be adjusted to meet the specified levels, one additional check must be performed.

12 Locate the "current" limit display LEDs (CR40 and CR41) on the T19401 or T18021 VaporVac Controller board.

13 Set the flow rate selector on the pulse simulator box to 10 GPM.

14 Reauthorize the fueling position, and place the pulse simulator box in the "Run" position. Watch the LEDs as soon as the pulse simulator box has been switched to "Run".

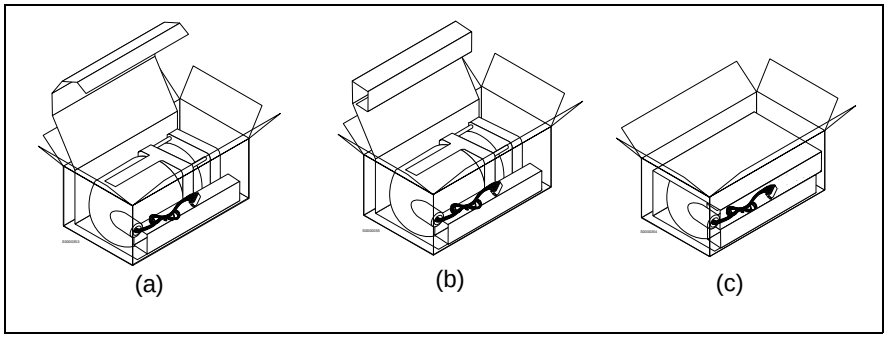
15 The LED, for the side that you are monitoring, should light and turn off quickly. If the LED stays lit or flickers for more than 3 seconds, the vapor pump/motor is drawing too much current. The "slope" trim pot (R30 or R52) will have to be adjusted down (counterclockwise) until the LEDs turn on/off quickly.

Returning VaporVac Pump/Motor

Pumps with short or crushed wires cannot be rebuilt and in some cases even tested. All motors returned for warranty credit must be of rebuildable condition with wire leads at least 26 inches long.

Spare part vapor pumps are packed in a reusable shipping container. Use this box to return vapor pumps to Gilbarco. The box has an insert that keeps the wires from being crushed by the casing of the vapor pump. Put the vapor pump in this box immediately after removing it from the VaporVac system. This will keep the wires from being damaged in transit to your shop.

Figure 7-45: Packaging VaporVac Motor for Return



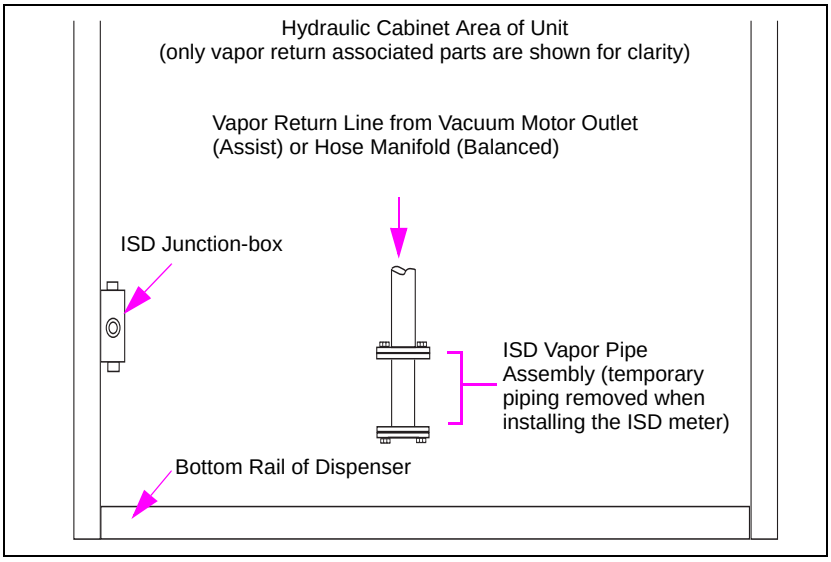
To return the VaporVac pump/motor, proceed as follows (see Figure 7-45):

1. The VaporVac motor box has an insert that is perforated at both ends. Seat the insert into the box, with the lower end “curled”.
2. Set the removed motor into the box (a). The motor nipple should be at the end of the curl.
3. Curl the upper end of the insert (b). Lower the upper end down into the box.
4. Insert the wire bundle in the upper curl (c), to prevent shipping damage. Close and secure the box flaps.

ISD Vapor Flow Meter

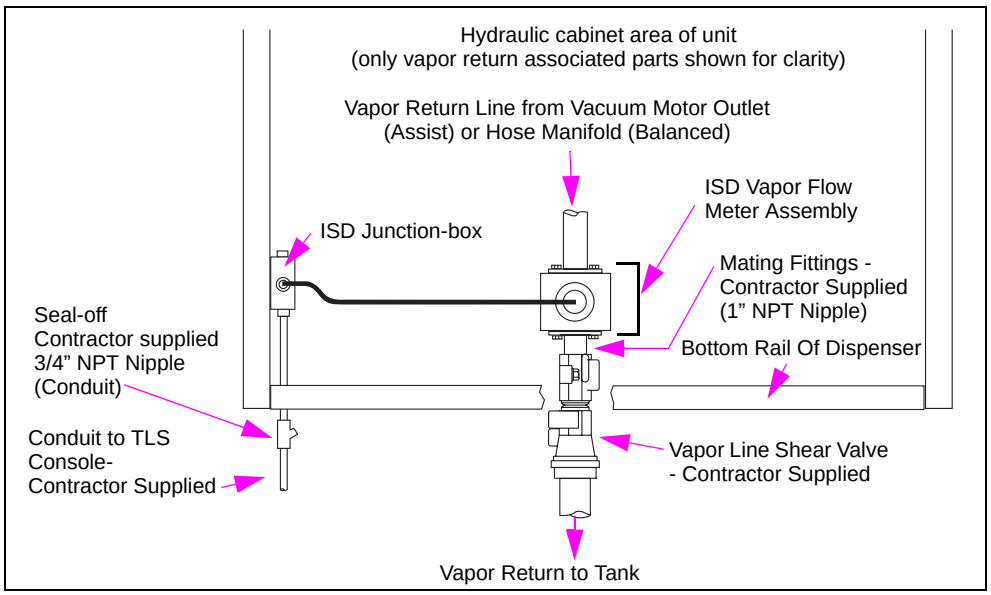
The Vapor Flow Meter, junction box and plumbing is part of an In Station Diagnostic (ISD) system that measures the amount of vapor returning to the UST and determines whether the Vapor Recovery system is operating correctly. Dispenser units are available as ISD-ready as an option. ISD-ready dispensers include adaptive plumbing and a junction box. See Figure 7-46 on page 7-76.

Figure 7-46: ISD-ready Dispenser (Facing Side B of Dispenser)


Hydraulic Cabinet Area of Unit
(only vapor return associated parts are shown for clarity)
Vapor Return Line from Vacuum Motor Outlet
(Assist) or Hose Manifold (Balanced)
ISD Junction-box
ISD Vapor Pipe
Assembly (temporary
piping removed when
installing the ISD meter)
Bottom Rail of Dispenser

ISD-ready dispensers are integrated with the ISD system by replacing the ISD vapor pipe assembly with an ISD vapor flow meter assembly. See Figure 7-47.

Figure 7-47: ISD-ready Dispenser with Vapor Flow Meter Installed (Facing Side B)



The vapor flow meter is in-line and near the vapor return shear valve in the hydraulic area of the dispensing unit. Ensure that there are no liquid flow traps. For more information on liquid traps, refer to MDE-3985 Encore Installation Manual.

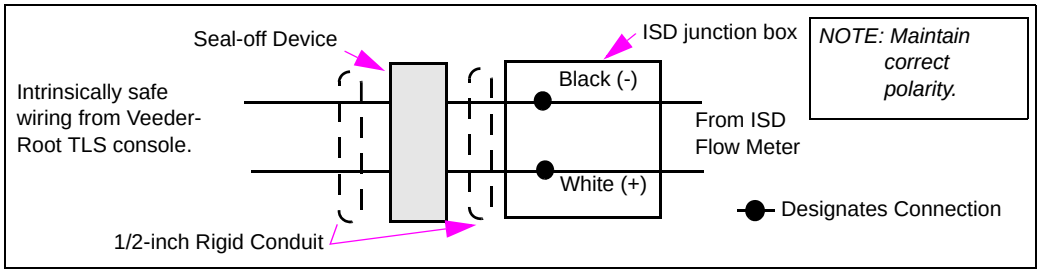
Wiring for the ISD vapor flow meter must be intrinsically safe and run in a separate conduit. Conduit must be potted where it enters and leaves any designated hazardous zones. Potting requirements for hazardous zones must be followed so that fuel vapors do not migrate to other areas.

Wiring from the ISD junction-box terminates at the Tank Level Sensor (TLS). See Figure 7-48 for correct polarity connections. Refer to ISD Vapor Flow Meter Installation Guide (Veeder-Root document number 577013-796) for additional information.
Note: Correct polarity must be maintained to ensure proper equipment operation.

⚠ WARNING

Wiring to this junction box must be intrinsically safe power from Veeder-Root TLS-350 or Gilbarco EMC series tank gauge consoles, and must be installed in accordance with Veeder-Root installation document No. 577013-796.

Figure 7-48: ISD Flow Meter Junction-Box Polarity



ATC Components

Read and follow all safety precautions as outlined in "Read this First" on page 1-1, this section and related sections of this manual. Follow OSHA Lock-out and Tag-out procedures.

Contents in this Sub-section

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ATC Mapping	7-77
Programming ATC	7-78

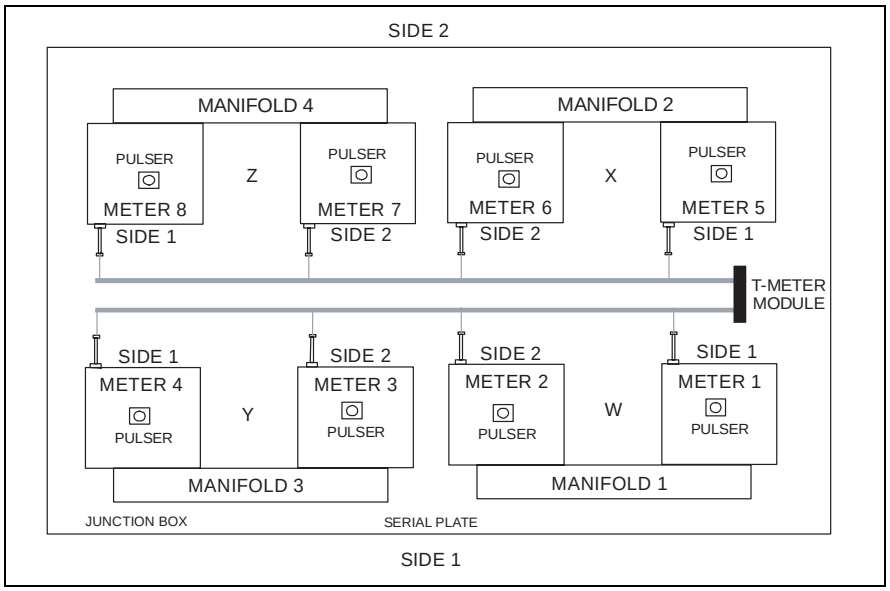
Purpose Of The ATC Option

ATC is an option that measures the temperature of the product being dispensed and compensates for the changes in product volume due to extreme changes in the ambient temperature.
Note: ATC is used in Canada only.

ATC Mapping

ATC temperature probes are mapped to meters in the Encore hydraulics as shown in the following diagram and table.

Figure 7-49: Meter Mapping Diagram



Product	Inlet	Side 1 Meter No.	Side 2 Meter No.
1	W	1	2
2	X	5	6
3	Y	4	3
4	Z	8	7
Blend Product	W and X	1 and 5	2 and 6

Programming ATC

ATC programming is accomplished through dispenser programming command codes. The following instructions are intended as an overview of ATC programming. Refer to "Pump Programming" on page 5-1.

Accessing Command Codes

Press **F1**, then enter the 4 digit security code for the level of the command code that is be accessed. Four zeros will flash on the display. Enter the appropriate command code, then press **ENTER** on the Manager Keypad.

ATC Review Mode

Command code 27 provides read-only access to ATC operating parameters. Function code 1 (default) provides for audit of last transaction data. Additional ATC data will be displayed depending on the function code selected. See the following table for ATC Function Codes and descriptions.

Function Code	Description	At Main Display		At Volume Display	At Grade 1 PPU Display
1 (default)	Audit Last Transaction	Gross volume		Net volume	Average temperature
2	Display Volume Correction Factor	27	2	Meter Number	Volume correction factor
3	Display Fuel Density	27	3		• 730 Gas • 840 Diesel
4	Display Temperature	27	4		Current temperature
5	Display Gross Volume Totals	27	5	Gross volume (most significant)	Gross volume (least significant)
6	Display Software Version	27	6		ATC version
7	Real-time Transaction Mode	Gross volume		Net volume	Current temperature

Enabling ATC

ATC is enabled at Level 4 at Command Code 91, Function Code 4.

Selection	Description
1 (default)	Not Installed
2	Installed

ATC Specific Error Codes

Code	Description
5091	ATC node communication failure
5092	ATC node present but not configured for ATC
5093	ATC node software download successful
5094	ATC node software download Authentication
5095	ATC node software download CRC error
5096	ATC node software download Flash error
5097	ATC node software download DownLoad Incomplete
5098	T-Meter not connected
5099	ATC - number of probes exceeds number of meters
5100	ATC - number or meter exceeds number of probes
5101	No Pulse train detected from T-Meters (T-Meter is connected)
5600	Fuel Density note not programmed
5601	ATC temperature out of range
5602	ATC node incorrect software version
5606	ATC node subscription failed
5609	ATC software not up to date

Service Tips

- ATC will not function unless the fuel density is entered.
- Encore 300 units with Proportional Flow Control Valves (PFCV) must be used with T20569-T2 ATC Interface Board. The G2 version can spare G1. Problems with proper display of side 2 of the unit will occur if proper version board is not used.

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8 – Theory of Operation and Troubleshooting

About this Section

Important Information about Releases

Sections of this manual may be released independently of each other to supply the most current data. Information about release date and version for independently released sections will be included in the section title and footer of the document. Refer to the Gilbarco Online document resource “GOLD” for the latest update.

This section was last updated in August 2007.

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• How a Self-Contained Pumping Unit Works	8-5
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Section Overview

This section provides the theory of operation and troubleshooting tables to help diagnose problems with individual components and systems. Observation, error code recording, and measurement taking are used, where applicable, to find the symptom and a possible remedy.

How to Use this Section

Use the "Topics in this Section" on page 8-1 to locate the appropriate topic. Review the information in "Theory of Operation" on page 8-2 to familiarize yourself with how the system works. Cable block diagrams in "Electronic and Electrical Components" on page 6-1, and "Hydraulic/Mechanical Components" on page 7-1 may also be helpful in analyzing problems. Go to the appropriate sub-section to finalize the search. Use the applicable table or chart to find a symptom and determine a remedy.

Terms Used in this Section

Term	Definition
PCB	Printed Circuit Board (PCB) is a dedicated component designed for a specific function with limited or non-existent intelligence or processing power. See "Printed Circuit Assemblies and Nodes" on page 6-5 for comparison.
PCV	The Proportional Control Valve (PCV) controls product blending as well as programmable maximum flow rates. This valve opens and closes by direction of electronic programming. Product flow determines the proper opening ratio of each PCV valve to maintain the required blend.

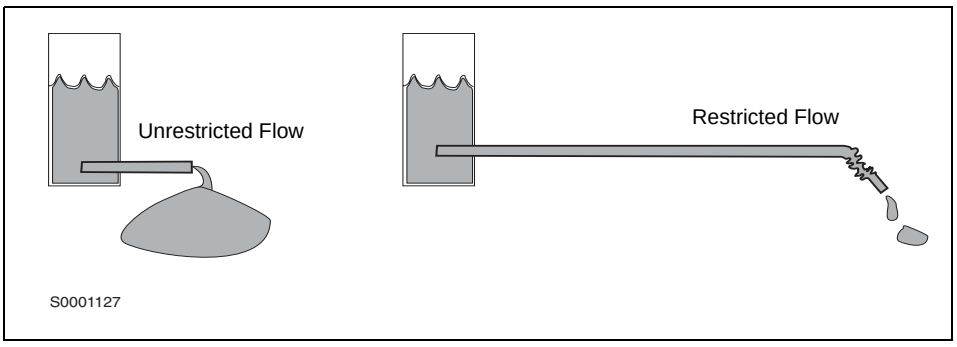
Theory of Operation

Understanding Flow Rate

Flow rate is the number of gallons dispensed per minute (GPM). In the United States, flow rate for gasoline dispensing devices is limited to 10 GPM. Flow rate may be affected by restrictions such as distance to the output, damage, and leaks in the line. These restrictions may reduce the flow rate.

Example (Figure 8-1): The left container has minimal restrictions, therefore a greater flow rate. The right container has many restrictions, therefore a lower flow rate.

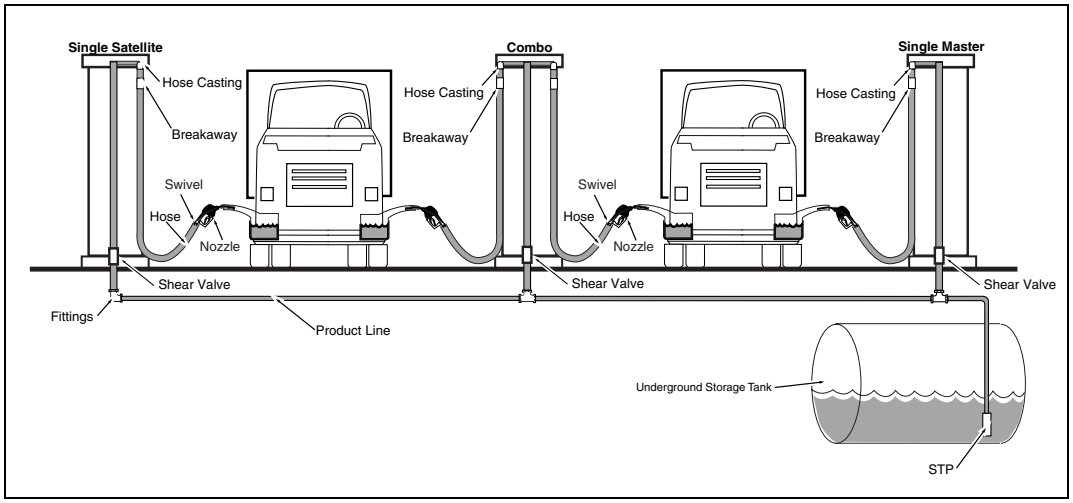
Figure 8-1: Flow Rate Examples



Flow Rate Restrictors

Each site's configuration has a number of restrictors that may affect flow rate. Figure 8-2 shows a typical site and its possible restrictors.

Figure 8-2: Possible Flow Rate Restrictors



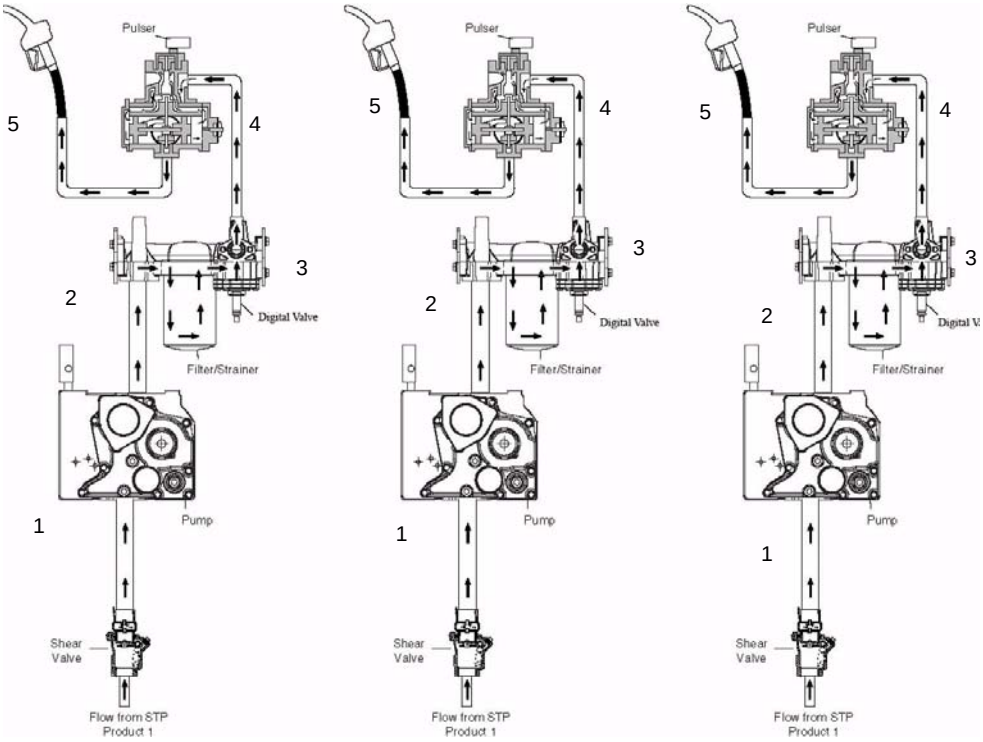
The following table identifies the possible restrictions in Figure 8-2 that may affect the site's flow rate.

Possible Restrictions	Reason for Restriction
Hose casting	Size and type of hose casting
Breakaway	Type and number of breakaways
Nozzle	Type of nozzle
Swivel	Type of swivel
Hose	Size and length of hose
Shear valve	Size and type of shear valve
Dispenser model	Type of dispenser (that is, High vs. Ultra-Hi vs. Super-Hi/master, satellite, combo, pump vs. dispenser, and so on).
Fittings	Number of fittings
Pipes	Size and length of pipe run
STP	Horsepower and output of STP
Check valves	Number of valves
Underground tank	Burial depth
Other flow considerations	Number of units dispensing per STP
Optional in line flow restrictors to limit maximum flow rate	The programmable maximum flow rates affecting valve operation available with certain models

How a Standard Dispenser Works

Note: The numbers in Figure 8-3 correspond to the numbered steps below.

Figure 8-3: How a Standard Dispenser Works



Note: Shear valves are not normally used with pumps, but may be required by some regulatory agencies.

1 Fuel passes through a shear valve and enters the dispenser.

2 Fuel flows through a strainer and filter.

3 Filtered fuel passes through a digital or proportional control valve.

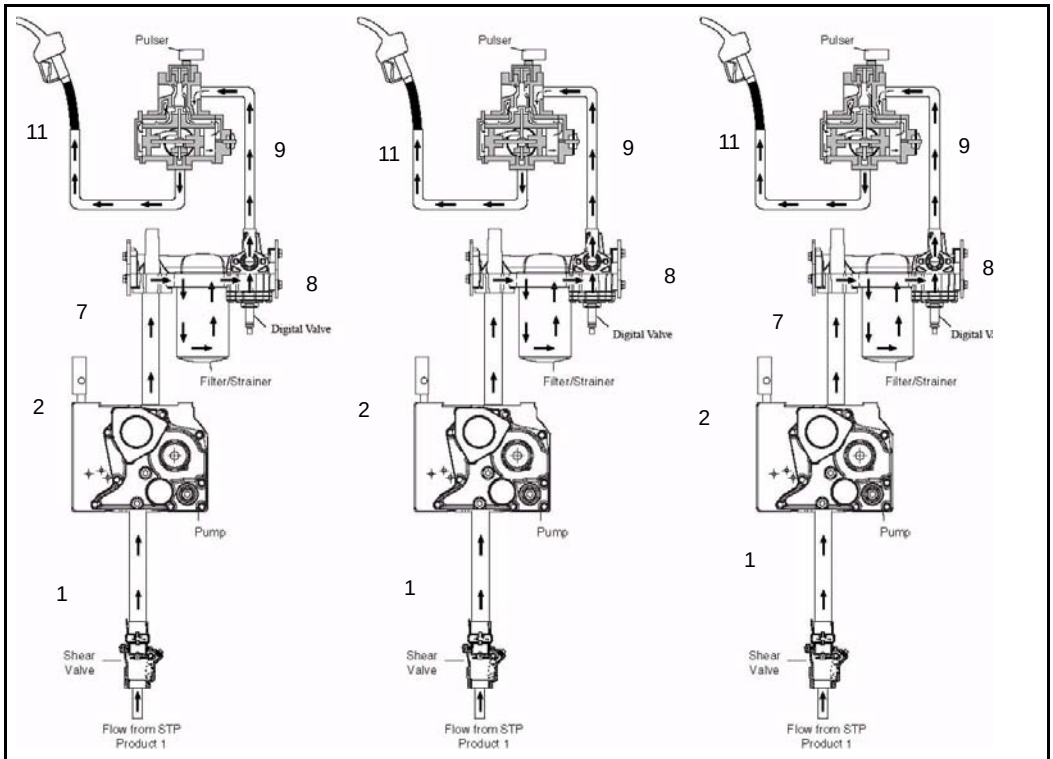
4 Fuel flows through a meter check valve and the meter measures fuel flow.

5 Fuel is discharged through the nozzle.
- In the case of blenders, two meters supply fuel to a single hose casting where fuel is combined prior to the hose.
- Directional valves are used in six-hose blenders to send the correct product for delivery to the hose.

How a Self-Contained Pumping Unit Works

The numbers in Figure 8-4 correspond to the numbered steps below.

Figure 8-4: How a Self-contained Pumping Unit Works



Note: Shear valves are not normally used with pumps, but may be required by some regulatory agencies.

1 For above ground tanks, a pressure regulator valve (model 52) is used at the base of the unit. Occasionally, shear valves are used for this as well as other applications.

2 Fuel enters through the pump inlet pipe, passing through a strainer or strainer/check valve located in the pumping unit.

3 Maximum pressure is regulated by the bypass valve, which recirculates fuel within the pumping unit.

4 The pump has an air separation system built within the pumping unit.

5 The sump separates air from the fuel, prevents air return to the pump when sump fuel level is low, and prevents air from passing through the nozzle and being metered when the underground tank is dry.

6 Air separated fuel flows back to the pump.

7 Air-free fuel flows out of the pump discharge line, through a filter.

8 Fuel then flows through the digital or proportional valve.

9 Fuel flows through a regulating (check/relief) valve. This valve keeps the meter full of fuel and helps relieve excessive pressure that could damage parts.

10 The meter measures fuel flow.

11 Fuel is discharged through the nozzle.

How a Master/Satellite - Ultra-Hi Dispenser Works

These models are for applications requiring higher flow rates. A master meters product and controls the satellite. This configuration can deliver up to 60 GPM. These units are available in the following formats:

- Standalone unit without a satellite
- Master unit that combines a standalone unit with piping to direct flow to the satellite
- Master Satellite Combo combines a master and satellite combination within the same unit

Note: Actual flow rate depends on installation and accessories used. Some local codes do not allow simultaneous operation of master and satellite.

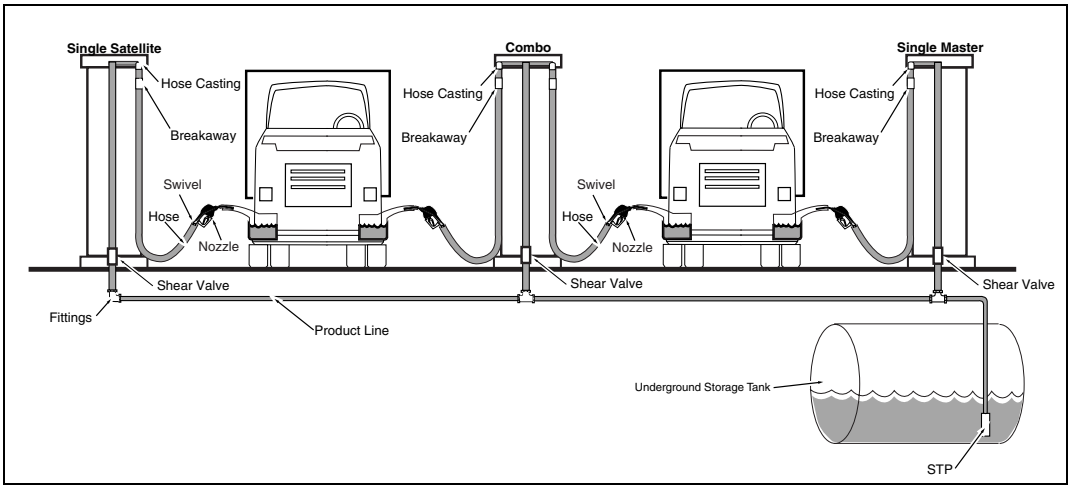
Unit Descriptions

Master - Piping in the master is teed before the master's solenoid valve to send product to the satellite. This arrangement allows for a higher flow rate in the master and satellite units when operating simultaneously.

IMPORTANT INFORMATION
Refer to NFPA 30A, local and state regulations to determine what type of operation is allowed in your area.

Satellite - The satellite unit operates in conjunction with a master unit which meters the fuel. It contains minimal electronics and hydraulics- consisting of a shear valve, solenoid valves, hose and nozzle. A combo unit is a master for a remote satellite unit, and is a satellite for a remote master or another combo unit.

Figure 8-5: Various Encore Ultra-Hi Configurations



Types of Operation

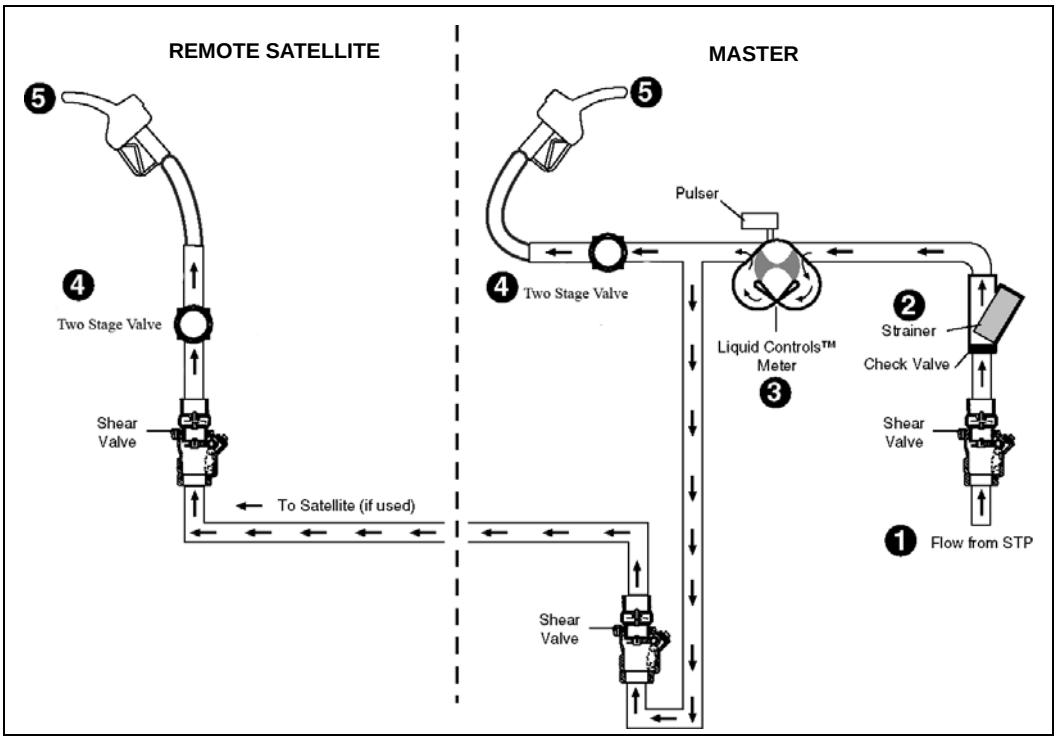
- **Simultaneous Operation** - Allows customer to fuel saddle-tank vehicle with master and satellite unit at same time.
  Note: Some regulatory agencies require a physical barrier to prevent access to another fueling vehicle if simultaneous operation is possible.
- **Independent Operation** - Allows customer to fuel a saddle-tank vehicle only one side at a time.

Master and Remote Satellite Piping

A Master and remote satellite system is shown in Figure 8-6.

Note: The numbers in Figure 8-6 correspond to the numbered steps below.

Figure 8-6: Master/Remote Satellite Fuel Flow Schematic



Operation

1. Product passes through a shear valve and enters the dispenser.
2. Product flows through a check valve and strainer.
3. Product flows through a Liquid Controls™ meter.
4. Metered product passes through a single-stage shutoff valve and slowdown valve in parallel or in more recent units, a two stage valve and/or through piping to the satellite.
5. Product flows through the remote satellite through a shear valve and through solenoid valves and then to the nozzle.
6. Fuel is discharged through the nozzle.

How Truck Stops are Configured

Figure 8-7, Figure 8-8 on page 9, Figure 8-9 on page 9, and Figure 8-10 on page 10 show sample master/satellite/combo configurations for use at truck stops.

Figure 8-7: Truck Stop Configuration - Single Master with Remote Satellite

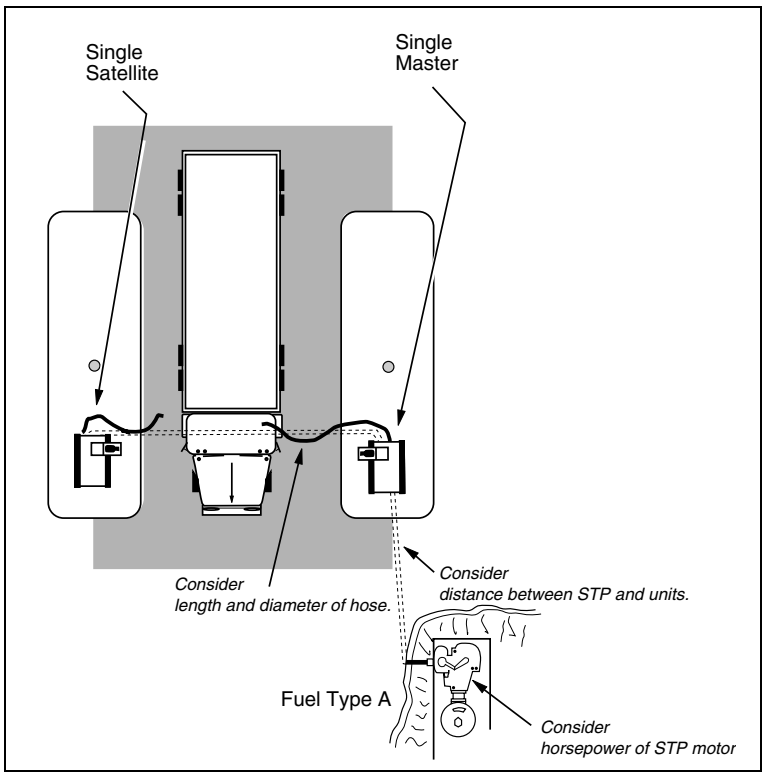

Single Satellite
Single Master
Consider length and diameter of hose.
Consider distance between STP and units.
Fuel Type A
Consider horsepower of STP motor

Figure 8-8: Truck Stop Configuration - Dual Master

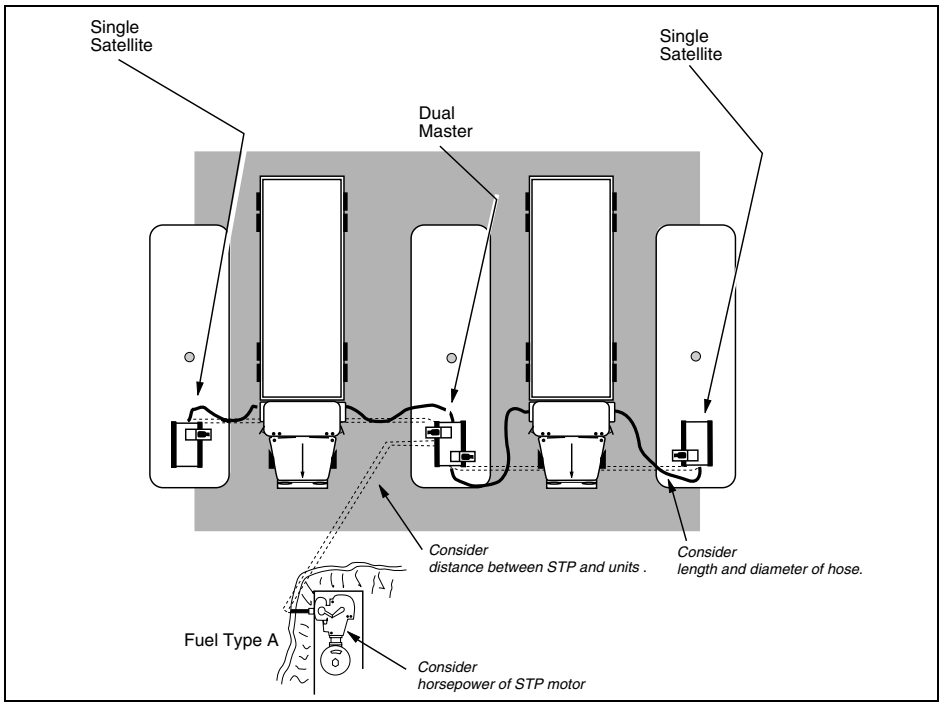


Figure 8-9: Truck Stop Configuration - Dual Satellite

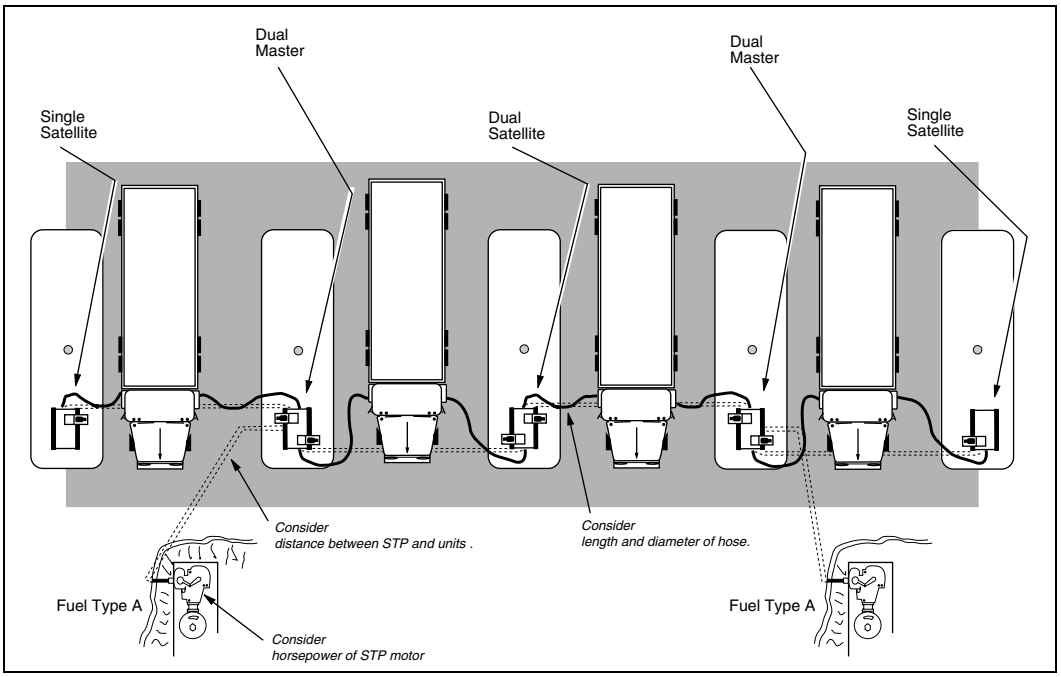
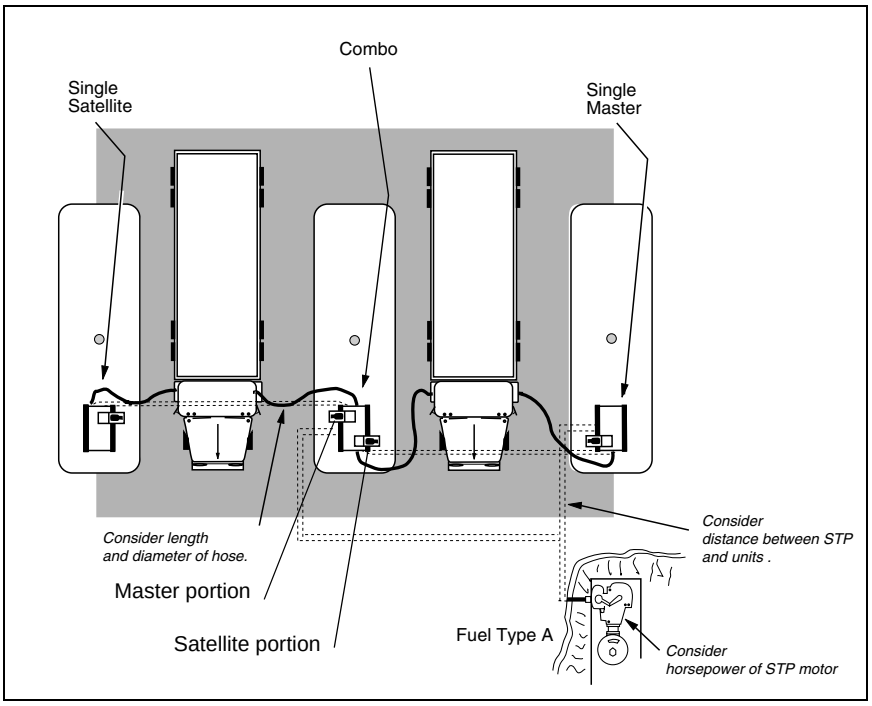


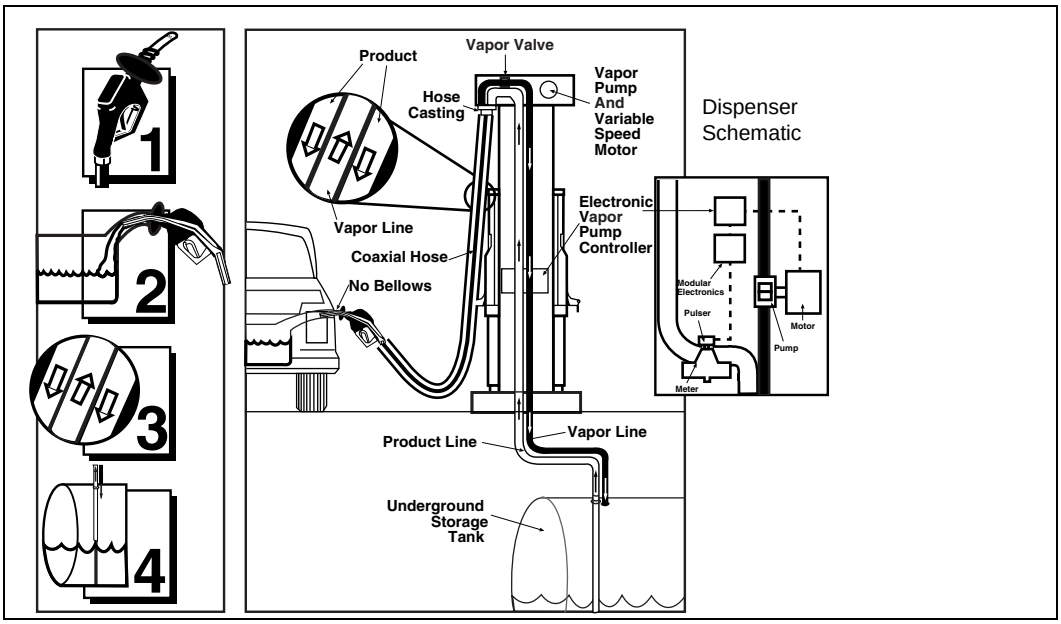
Figure 8-10: Truck Stop Configuration - Combo



How VaporVac Vacuum Assist Vapor Recovery Works

Note: The numbers in Figure 8-11 correspond to the numbered steps below.

Figure 8-11: How VaporVac Vacuum Assist Vapor Recovery Works



1 The customer who is fueling places the VaporVac nozzle in the vehicle's fill pipe. Vapors flow through holes in the nozzle spout.

2 As the vehicle's fuel tank fills, the VaporVac controller uses the pulser signals from the meters to track the real-time flow rate.

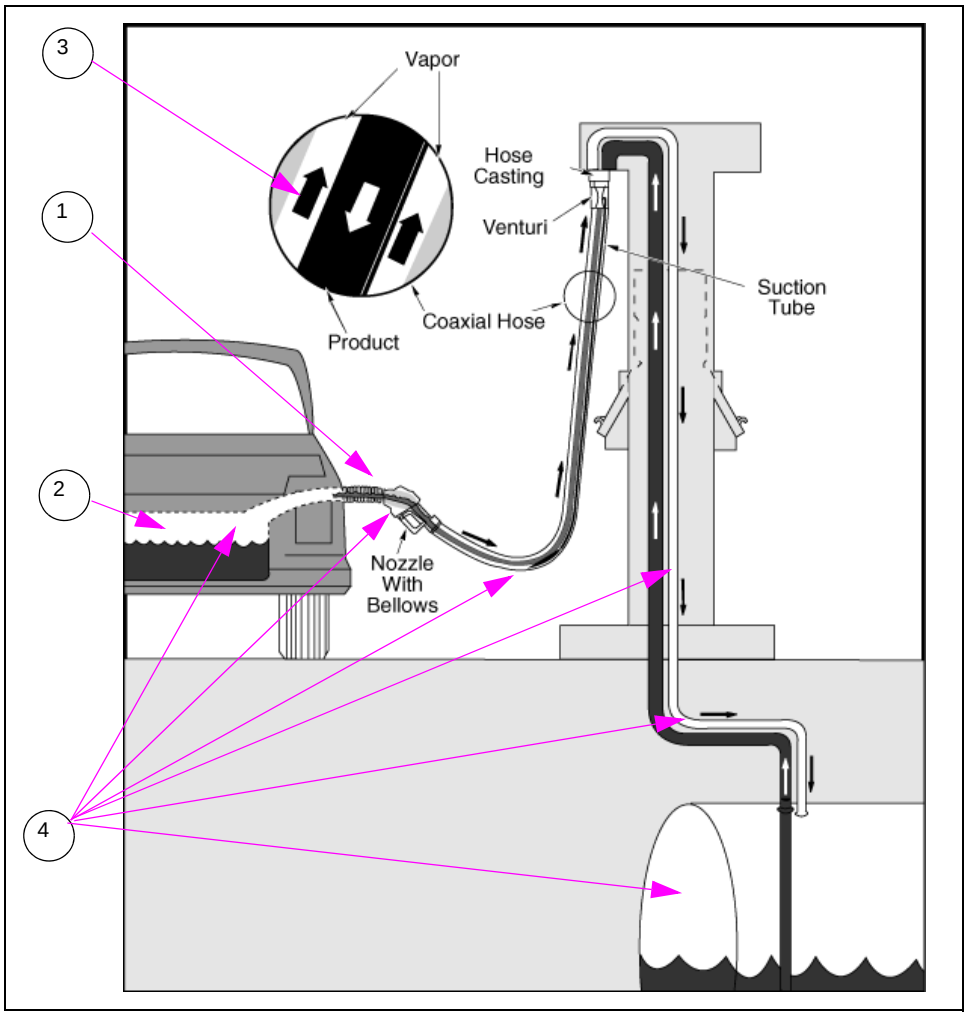
3 The variable speed VaporVac pump creates a vacuum which removes vapors from the vehicle tank at a speed proportional to the real-time flow rate.

4 The vapors return to the fuel storage tank through standard (balance system) underground vapor piping. There is no need for any additional vapor processing.

How Stage Two (Balance Type) Vapor Recovery Works

Note: The numbers in Figure 8-12 correspond to the numbered steps below.

Figure 8-12: How Stage Two (Balance Type) Vapor Recovery Works



1 The fueling customer places the nozzle in the vehicle's fill pipe and compresses the nozzle bellows to form a pressure tight seal.

2 A slight pressure develops in the car tank during fueling, which forces vapor back to the dispenser through the nozzle.

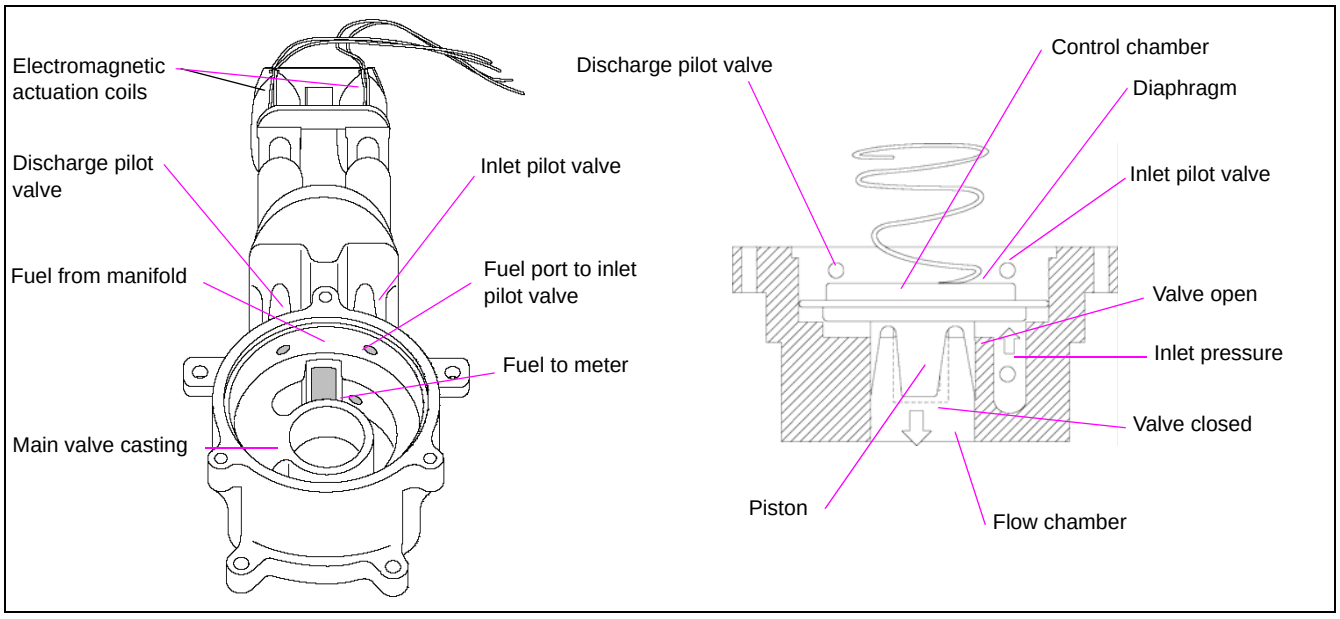
3 Balance systems use coaxial hoses to remove vapors. Fuel flows through the inner hose and vapor flows through the outer hose. A venturi pump in the hose removes liquid (via a suction tube) from the outer hose.

4 As system pressure balances, the vapors flow from the vehicle fuel tank through the bellows, nozzle, outer hose, dispenser vapor piping, and underground piping to the underground storage tank.

How a Digital Valve Works

The Gilbarco Digital Valve (Figure 8-13) consists of an aluminum main valve casting, a diaphragm/piston assembly and two pilot control valves with electromagnetic actuation coils. The diaphragm/piston assembly divides the main valve casting into flow, control and inlet chambers. Fluid pressure in the control chamber is determined by inlet pressure and the pilot valves as well as the nozzle opening state. One pilot controls fuel flow into and out of the control chamber, thereby raising or lowering pressure in relation to the flow chamber. The other pilot valve bypasses flow through the valve during slow flow times such as during the pulser test and just before hitting a preset target. The valve is biased via a spring to maintain a back pressure of 2.5 PSI. When control chamber pressure is equal to or higher than flow chamber pressure, the valve closes and fuel flow stops. When control chamber pressure is lower than flow chamber pressure, the valve opens.

Figure 8-13: Digital Valve Components



The following table describes how the valve operates in various modes.

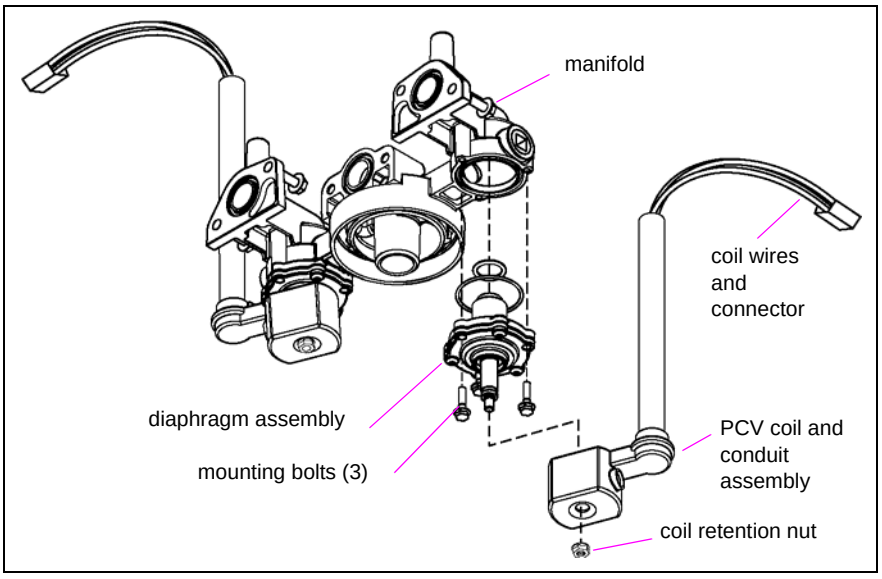
Mode	Operation
Valve at rest (unpowered)	• The inlet pilot valve is open, maintaining pressure in control chamber. • The discharge pilot valve is closed, preventing loss of pressure in control chamber. • Diaphragm/piston assembly is seated, closing main valve. • Equal pressure in the two chambers holds the diaphragm against main valve seat. • No fuel flows when the nozzle opens.
Slow flow	• Inlet pilot valve is open. • Discharge pilot valve opens (energized). • This allows fuel to flow at about 1/2 GPM (low flow) when the nozzle opens.
Full flow	• The inlet pilot valve closes (energized). • The discharge pilot valve opens (energized). • Pressure in the control chamber drops. • Diaphragm/piston assembly forced upwards by pressure in flow chamber. • Fuel flows at rate set by software and nozzle opening.

Mode	Operation
Regulate	• The inlet pilot valve closes (energized). • The discharge pilot valve is closed. The discharge pilot valve is opened variably based upon software to accommodate blend ratios. • Control chamber pressure maintained at constant level. • Discharge flow for the involved valve continues or adjusts at a rate determined by software.
Power fail	• Inlet pilot valve opens. • Discharge pilot valve closes. • Diaphragm/piston assembly seats, closing main valve. • Equal pressure in two chambers holds the diaphragm against main valve seat. • No fuel flows.

How a Proportional Control Valve (PCV) Works

The Proportional Control Valve (PCV) (Figure 8-14) utilizes an analog signal to control flow while providing smooth and quiet operation.Opening the pilot orifice causes pressure above the diaphragm to decrease so that the diaphragm lifts off the main valve seat. This opens the main orifice until the valve is de-energized. When controlled by the Gilbarco electronics in a closed loop system, proportional flow control is obtained by controlling the plunger position. Coils and conduit are a combined unit and the diaphragm is easily replaced. The PCV can be programmed for flow control for blenders (not for Encore 300 units).

Figure 8-14: Proportional Control Valve Assembly and Manifold



1 A low voltage signal is sent to the valve coil. The valve opens a slight amount to create during the pulser test.

2 Once the pulser has been verified as good, then a higher voltage is sent to the valve to accomplish the following:
- Wide open if not a blender or limited by a programmable flow rate.
- Partially open to maintain a blend ratio in conjunction with a parallel valve or if programmable flow control is present.

3 For a blender or a pre-programmed maximum flow rate, the valve will be open or closed based upon a revised signal from the electronics to maintain the blend ratio and/or maximum flow during delivery.

4 For preset sale, near the end of that sale, the valve signal is reduced to create slow flow and to allow the valve to close on target.

The following table describes how the valve operates in various modes.

Mode	Operation
Valve at Rest (Unpowered)	• Supply pressure is allowed above the diaphragm through the eyelet bleed hole. The plunger is pressed against the pilot orifice by a spring maintaining pressure above the diaphragm. • Slightly greater or equal pressure in the inlet chamber and above the diaphragm holds the diaphragm against main valve seat. • No fuel flows.
Slow Flow	• The solenoid is energized such that the plunger raises slightly above the pilot orifice. • Flow occurs through the eyelet bleed hole and through the pilot orifice. • Pressure above the diaphragm is still high enough to keep the diaphragm against the main seat.
Full Flow	• The solenoid is energized and the plunger raises further above the pilot orifice. Flow increases though the pilot orifice decreasing pressure above the diaphragm. • The diaphragm is forced upwards by pressure in the inlet chamber. • Fuel flows through the main valve seat and main orifice. • Flow rate is set by software by raising or lowering plunger slightly.
Regulate	• The dispenser electronics adjust the solenoid signal to the plunger to maintain any programmed maximum flow rate or to maintain a blend ratio. • Discharge flow continues at rate determined by software.
Power Fail Solenoid is de-energized	• Plunger is pressed against the pilot orifice by a spring. • Pressure increases above diaphragm pushing diaphragm against main valve seat. • Equal pressure in the inlet chamber and above the diaphragm holds the diaphragm against main valve seat. • No fuel flows.

How the Electronics Works for the Encore 300

1 Customer raises pump handle.

2 Signal travels to the pump controller board through the hydraulic interface board.

3 The pump controller sends signals to the displays for reset and price display.

4 The pump controller, via the hydraulic interface, signals the console for authorization.

5 The pump controller signals the hydraulic interface to activate the STP for dispensers (or self-contained pump motor for pumps).

6 Attendant authorizes sale at console. Console sends preset sale data (if applicable) to the pump controller via the hydraulic interface.

7 Customer begins fueling, which initiates valve slow-flow.

8 The pump controller receives pulses through the hydraulic interface from the pulser. The meter turns with fuel flow which rotates the pulser shaft.

9 After ten pulses, the pump controller signals the hydraulic interface to initiate full-flow in the valves.

10 During delivery, the pump controller receives volume pulses and translates them into cost information.

11 This information is sent to the displays and the console. For a preset delivery, the pump controller signals the hydraulic interface to slow the product flow and stop at the preset amount.

12 Customer lowers pump handle.

13 The pump controller signals the hydraulic interface to remove power from the valves and STP or self-contained pump motor to stop product flow.

14 The pump controller loads delivery amount into memory and sends this information to the console via the hydraulic interface and two-wire circuit.

CRIND Device

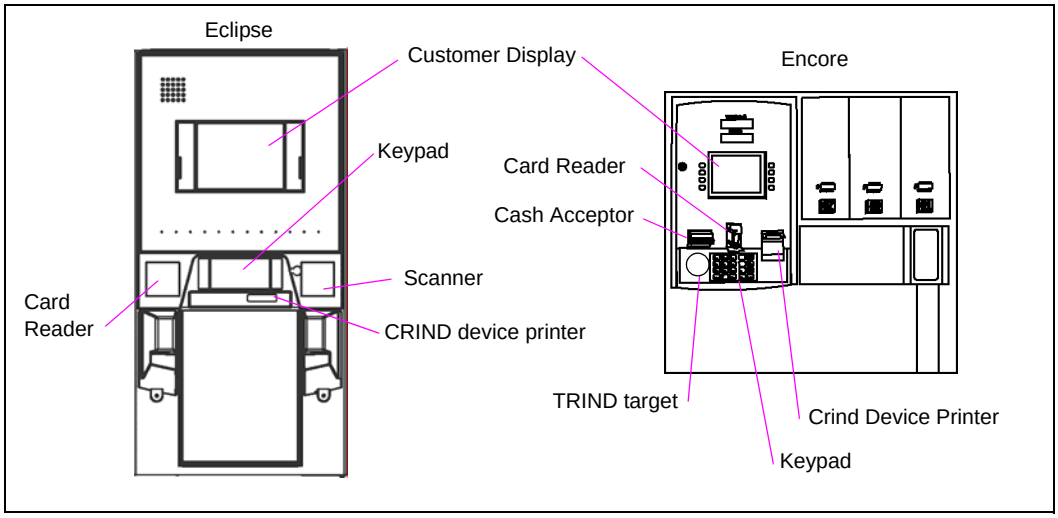
The Card Reader In Dispenser (CRIND) device is a customer activated point-of-sale terminal located at the dispenser that accepts cash, credit cards, and debit cards. It allows customers to activate the dispenser without help from station attendants. It communicates with the site controller (G-SITE or Passport for MOC CRIND devices or third-party controller for generic CRIND devices). The site controller communicates with credit/debit networks. The CRIND device contains the following assemblies:

- Keypad
- Customer display (single-line, monochrome or color)
- Receipt printer
- Magnetic stripe card reader
- Printed circuit boards
- Cash acceptor (optional)
- TRIND device (optional)
- Scanner (optional)
- Cold weather option kits

Information in this section applies to CRIND devices in all Gilbarco dispensers, unless otherwise noted.

- The single-line CRIND displays prompts and messages on a 14-segment, 20-character, single-line display on the CRIND door.
- The Monochrome LCD CRIND displays multiline prompts, advertising messages, and graphics (no video) on a monochrome LCD screen on the CRIND door.
- The color display is a CRIND option that allows CRIND devices to display multiline prompts, advertising messages, graphics, and videos on a full-color screen on the CRIND door.
- The cash acceptor option allows CRIND devices to accept cash payments, in addition to credit and debit cards.
- The External CRIND (eCRIND) adds card reader capabilities to a competitive pump. The Card Reader reads the magnetic stripes on standard credit cards and debit cards.

Figure 8-15: Various CRIND Devices on Eclipse and Encore Units



How a TRIND Device Works

Overview

The TRIND device is an option available as a retrofit kit or factory installed device. The device is connected to the CRIND device via a Gateway or Serial Interface board. In this application, the TRIND device is a software slave to the CRIND and the associated Point Of Sale (POS) Controller/Host. This means that a properly working TRIND system will look for and read tags, but only when “told” to do so by the controller, through the CRIND application.

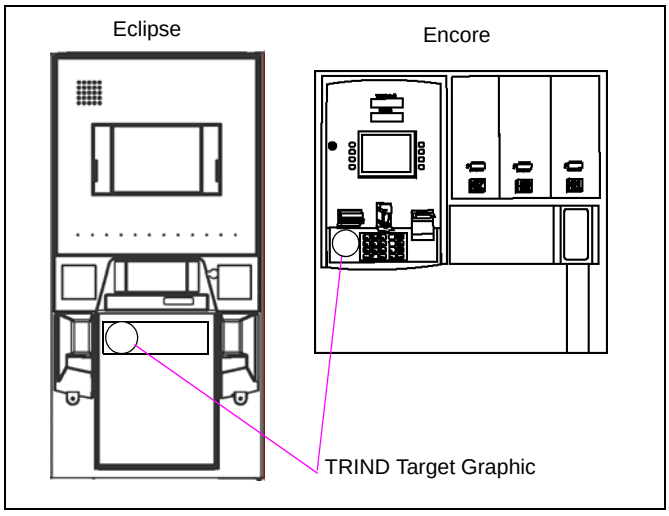
The TRIND system uses an electronic system located in the pump or register to “talk” with a miniature radio-like device (a tag). Together, these electronic devices provide “cashless” access to gasoline, food and merchandise by charging purchases to a credit card, check card, or other account you already have. The TRIND system operates on a dedicated tag identification code. Your credit card or check card account numbers are not typically used with the tag signal system, which protects your account from unauthorized use.

TRIND utilizes radio frequency (RF) waves to communicate with a customer’s transponder. For car tag systems, transmitters located on overhead assemblies transmit radio waves that serve as a “wake up” call. As a car mounted transponder enters the transmitter’s effective read zone, the transponder is activated. The transponder then transmits a code which is received by the TRIND antennas mounted overhead or on the option doors. For hand-held tag systems, the transmitter is located behind the target graphic. See Figure 8-16.

This transmitted code is communicated from the TRIND to the CRIND unit, and from there to the POS. The POS system communicates with a host to obtain authorization.

Car mounted transponders are activated when they are within 6 feet of the front of the dispenser perpendicular to front of dispenser. Hand held transponders, usually on a key chain, function when pointed at a target graphic on the option door. Two-way communication is indicated when the option door target graphic light comes on, whether by car mount or hand-held transponder signal.

Figure 8-16: Encore and Eclipse TRIND Target Graphic Location



How a Cash Acceptor Works

1. Insert a currency bill (or quarters on some units). The Cash Acceptor accepts bills face up, or down, and from either end depending upon the setup.
   - There will be a short delay while the system “reads” the bill.
   - Listen for the stacking of the bills.
   - The system will register the Cash Acceptor total on the pump screen and on the printout at the pump.

2. Repeat Step 1 above with another bill or lift the nozzle.

3. Select the fuel grade and begin pumping fuel (or select car wash and follow prompts). Once the fuel grade (or car wash) is selected, the customer cannot put more money into the Cash Acceptor until the fueling transaction is complete.

   Note: The customer cannot pay for a completed sale at the Cash Acceptor. Incomplete sales result in receipt that shows a refund due to the customer. This refund is tendered by the cashier. The printer must be operational and contain paper for the cash acceptor to work.

For more information on Cash Acceptors, refer to MDE-3826 Cash Acceptor (Mars) User Guide for Managers and Cashiers Using G-SITE Systems (located in the CRIND and TRIND library on GOLD).

How a Scanner Works

When interfaced with a POS system, the Bar Code Scanner option allows customers to scan the bar-coded loyalty card on Card Reader In Dispenser (CRIND) device equipped units. G-SITE systems require that the Automatic Identification Manufacturers (AIM) code be enabled for proper operation. CRIND device scanner diagnostics can be used to enable and disable the AIM code as necessary. Refer to Passport documentation for information particular to that system.

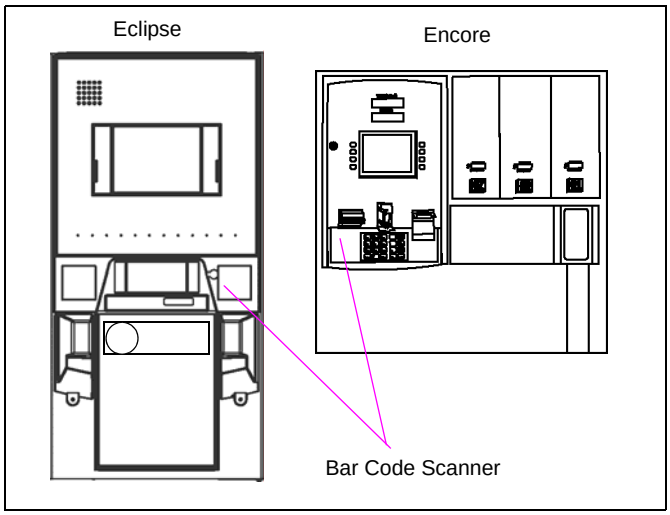
The scanner mechanism uses a low power laser directed downward that reads bar codes, that are presented directly below the scanner window. The bar codes are interpreted by the scanner components and information is sent through the CRIND to the POS for processing. The POS system responds to the information by sending special commands to the CRIND for authorizing specialized loyalty card discounts and so on.

In Encore 500 and Eclipse units, the scanner is controlled by a Local Area Network (LAN)/ Serial Node per unit.

Service Tip

The Encore 500 and Eclipse Bar Code Scanner require CRIND BIOS software version 200.30 or greater in order to operate properly.

Figure 8-17: Encore and Eclipse Bar Code Scanner Location



How Automatic Temperature Compensation (ATC) Works

The ATC option measures the temperature of the dispensed product and compensates for changes in product volume due to changes in fuel temperature to a standard defined temperature. The ATC option uses the following components:

- ATC Meter Cover (contains the thermal test well and ATC probe - senses fuel temperature)
- T-meter Module (gathers and processes information from ATC probes)
- Intrinsic Safety (I.S.) barrier
  - provides power to T-meter module
  - provides data path from T-meter module to ATC controller board
- ATC Controller Board (replaces the valve driver board - controls the fuel flow valves)

In an ATC equipped unit, fuel temperature is monitored via a thermocouple probe commonly integral to the meter or optionally in close proximity. This temperature is compared against a predetermined “Standard” temperature for the country or region involved. The ATC equipment intercepts pulser signals prior to information being sent to the Pump Control Node or pump controller and adjusts the pulse count to reflect the pulse count that would have occurred if the fuel was metered at the “Standard” temperature. If fuel being metered is hotter than the standard temperature, pulse count is reduced. If fuel being metered is colder than the “Standard” temperature, pulse count is increased. Adjustment changes as the fuel temperature into the meter changes.

Refer to MDE-3139 Automatic Temperature Compensation (ATC) Troubleshooting Information in The Advantage and Legacy library on GOLD.

Error Codes

Encore 300 Error Codes

20 - 44

Code	Description
20	Pulser Fail
21	Non-existent memory
22	Not used
23	Grade assignment changed
24	Conversion Factor Changed - Not programmed
25	Two-Wire/Stand Alone changed
26	No conversion factor table
27	Side A Two-Wire ID changed
28	Side B Two-Wire ID changed
29	Pump Time-Out error
30	VaporVac fail both sides or Vapor Sense
31	Totals data error
32	Pulser count error
33	VaporVac fail both or Push-To-Start button activated
34	Battery charge low
35	Configuration data error
36	Unit type configuration code changed
37	PIN Code 1 changed
38	PIN Code 2 changed
39	Cash/Credit Option changed
40	Master Reset jumper in place
41	Side Exists option changed
42	PPU Option changed
43	Not used
44	Pump handle on at power up

4301 - 4329 (Blend Error Codes)

Code	Description
4301	Communication Time-Out
4302	Blend Controller busy
4303	Communication limit
4304	Communication limit
4305	Received Data Error
4306	Received Block Error
4307	Blends not programmed
4308	No blend table
4311	Lo Product Low Flow
4312	Hi Product Low Flow
4313	Lo Product No Flow
4314	Hi Product No Flow
4315	Hi Product Contaminated by Lo
4316	Lo Product Contaminated by Hi
4317	Lo Product Surge
4318	Hi Product Surge
4319	Undefined Surge
4320	Valve configured for but not responding
4321	Valve stuck
4322	Valve board not detected
4323	Pulser Fail
4324	Invalid Command/Software
4325	Maximum Pulse Lag exceeded
4326	Lost Communications
4327	Software Stack error
4328	BPC Slow in Removing Pulses
4329	Leaky Valve

Encore 500 and Eclipse Error Codes

Error Codes (E1 - E8) are displayed in Main Money display or PPU (XXXX) display.

Error codes (11 - 5614) that appear on the main display when an error occurs are useful in diagnosing problems with the pump/dispenser.

E1 - E8

Code	Description	Level
E 1	Database Corrupted	Super-Major
E 2	Flash Corrupted	Super-Major
E 3	LON configuration error	Super-Major
E 4	One or more tasks not started	Super-Major
E 5	Cold Start was forced	Super-Major
E 6	Redundant data storage error	Super-Major
E 8	Data base changed, set as default the new values	Super-Major

0 - 50

Code	Description	Level
11	2-wire communications lost (disconnected)	Minor
20	Pulser connected and product is not mapped	Super-Major
20	Pulser disconnected and product is mapped	Super-Major
24	Volume unit type not set	Major
26	Pump not calibrated	Major
27	Two Wire ID changed side A	Undefined
28	Two Wire ID changed side B	Undefined
29	Valve Not Open	Medium
30	Catastrophic error has occurred on the VaporVac	Super Major
33	E-stop button activated or VaporVac fail one side	Medium
35	Configuration data error	Medium
37	Pin code 1 changed	Undefined
38	Pin code 2 changed	Undefined
39	Cash/Credit option changed	Undefined
41	Side exists option changed	Undefined
42	PPU option changed	Undefined
44	PPU Board pump handle on at power up	Medium

4000 - 4999

Code	Description	Level
4307	Blends not programmed	Super Major
4311	Blender-Lo Octane Product Low Flow	Minor
4312	Blender-Hi Octane Product Low Flow	Minor
4313	Blender-Lo Octane Product No Flow	Minor
4314	Blender-Hi Octane Product No Flow	Minor
4315	Blender-Hi Octane Product contaminated by Lo Octane	Minor
4316	Blender-Lo Octane Product contaminated by Hi Octane	Minor
4320	Valve configured for, but not responding	Super Major
4321	Valve stuck	Super Major
4322	Valve board not responding	Super Major

5000 - 5025

Code	Description	Level
5000	Meter 0 calibration changed	Undefined
5001	Meter 1 calibration changed	Undefined
5002	Meter 2 calibration changed	Undefined
5003	Meter 3 calibration changed	Undefined
5004	Meter 4 calibration changed	Undefined
5005	Meter 5 calibration changed	Undefined
5006	Meter 6 calibration changed	Undefined
5007	Meter 7 calibration changed	Undefined
5008	Blend ratio changed for product 1	Undefined
5009	Blend ratio changed for product 2	Undefined
5010	Blend ratio changed for product 3	Undefined
5011	Blend ratio changed for product 4	Undefined
5012	Blend ratio changed for product 5	Undefined
5013	Blend ratio changed for product 6	Undefined
5014	Blend ratio changed for product 7	Undefined
5015	Blend ratio changed for product 8	Undefined
5016	Flow Control Setting changed per product 1	Undefined
5017	Flow Control Setting changed per product 2	Undefined
5018	Flow Control Setting changed per product 3	Undefined
5019	Flow Control Setting changed per product 4	Undefined
5020	Flow Control Setting changed per product 5	Undefined
5021	Flow Control Setting changed per product 6	Undefined
5022	Flow Control Setting changed per product 7	Undefined
5023	Flow Control Setting changed per product 8	Undefined
5024	ATC enabled	Undefined
5025	ATC disabled	Undefined

5026 - 5099

Code	Description	
5026	ATC base value changed	Undefined
5027	Sealable switches have been accessed	Undefined
5028	Measurement unit volume changed To Liters	Undefined
5029	Measurement unit volume changed To Gallons	Undefined
5030	Measurement unit volume changed To Imp. Gallons	Undefined
5031	Measurement unit volume changed Hawaiian Gallons	Undefined
5041	Power Fail-Power circuit register a power loss	Undefined
5047	Reverse flow detect	Medium
5048	No flow detect eMINOR	Minor
5049	Unauthorized flow detected	Medium
5050	Invalid Pulser-Pulser Pattern does not fit profiled meter	Medium
5066	STP 1 configured for, but not connected	Super Major
5067	STP 2 configured for, but not connected	Super Major
5068	STP 3 configured for, but not connected	Super Major
5069	STP 4 configured for, but not connected	Super Major
5070	Vapor Vacuum option set, but VV board not present	Super Major
5071	Vapor Vacuum option NOT set, but VV board is present	Minor
5072	Vapor Vacuum option set connected	Super Major
5074	Vapor Vacuum motor not responding	Medium
5079	Valve Not Configured for, but is responding	Minor
5081	Air sensor NOT connected, but option is set	Super Major
5091	ATC node Communication Failure. ATC option set	Super Major
5092	ATC node present, but not configured for	Minor
5098	T-Meter Not Connected	Super Major
5099	ATC- number of probes exceeds number of meter	Minor

5100 - 5121

Code	Description	
5100	ATC-number of meters exceeds number of probes	Medium
5101	No Pulse train detected from T-Meters. The T-Meter is connected	Super Major
5111	Door node Communication Failure	Super Major
5115	Door node software download Flash Error	Medium
5116	Door node software download incomplete	Medium
5118	PPU Board Communication Failure	Major
5119	PPU Board Present but, not configured for	Minor
5120	PPU Board pump handle not connected	Major
5121	PPU Board Grade select button not connected	Major

5126 - 5199

Code	Description	Level
5126	Key stuck on Manager Keypad	Minor
5131	PPP keypad option set, but Not present	Super Major
5132	PPP keypad present, but not configured for	Minor
5133	Key stuck on PPP keypad	Minor
5134	Call button option set, but Not Present	Super Major
5135	Call button present, but not configured for	Minor
5136	Call button stuck	Major
5137	E-Stop option set, but not present	Super Major
5138	E-Stop button present, but not configured for	Minor
5139	E-Stop button stuck	Major
5140	Push to Start button option set, but not present	Super Major
5141	Push to Start button present, but not configured for	Minor
5142	Push to Start button stuck	Major
5171	Power Fail Manager Keypad mode exited	Undefined
5174	Totalizer node communication Failure	Major
5175	Totalizer Node detected, but not configured for	Minor
5183	Totalizer present, but no return pulse detected	Major
5198	Measurement unit changed not programmed	Undefined
5199	Measurement unit changed 500 pulses per gallon	Undefined

5235 - 5241

Code	Description	Level
5235	Database corrupted	Minor
5236	Database build process started	Minor
5239	Database init forced	Minor
5240	Database wrong read	Minor
5240	Database read failed	Minor
5240	Database wrong write	Minor
5241	Database write failed	Minor

5378 - 5647

Code	Description	Level
5378	Customer interface door node configuration not received	Major
5413	PPU Option pump handle not connected correctly	Medium
5600	Fuel density not programmed	Super Major
5601	ATC temperature out of range	Medium
5602	ATC node incorrect software version	Minor
5603	Door node incorrect software version	Minor
5604	Totalizer node incorrect software version	Minor
5605	MIP node incorrect software version	Minor
5606	ATC node subscription failed	Super Major
5607	Door node subscription failed	Super Major
5608	Totalizer node subscription failed	Super Major
5612	TW converter error	Minor
5613	Pump updated with data from door node storage	Minor
5614	Door node A updated with data from pump node	Minor
5616	Pump and door node storage match	Minor
5647	Printer node current software version	Undefined

Troubleshooting

Common Failure Modes with Solutions

This section presents some common failure issues in the field that can best be solved by performing the steps included for the observed problem. This information and similar for other significant and common problems is published at the Technical Resource Page (TRP) under: http://www.gilbarco.com/interactive/login.cfm.

You must be a certified technician with pre-approved access through your company Gatekeeper to access this information. It is strongly suggested that you monitor the TRP frequently for similar useful information.

Electrical

Blank Monochrome Display (SB745)

If the monochrome displays are blank on the Encore 300 (the F1 fuse (8.5 Volts) may also be blown on the CRIND Regulator Board) or for the Encore 500/Eclipse, the overload LED (CR 10) on the 18 Volts DC Power Supply is on. The first thing that needs to be checked is the C45 capacitor on the back of the monochrome display. C45 may show signs of being burnt. Use an ohmmeter to determine if the reading across the capacitor is zero to a few ohms. If so, the capacitor is bad (approximately 4.5K ohms or higher is a good reading). If C45 is bad, the monochrome display and F1 fuse (Q12682-06) will need to be replaced on the Encore 300. For the Encore 500/Eclipse, the monochrome display will need to be replaced. Current production units use Q13908-05 monochrome displays that do not have a C45 capacitor.

Power Supply M00050 Shutting Down (SB910)

The in rush current for a E500/Eclipse at power up may create a false over-current fault that will shutdown the dispenser. If a unit shuts down and LEDs are not properly lit on the 18 Volts power supply, inspect the M00050 18 Volts supply board for its revision level. If you have revision F, G or H you may need to clip R9 off the 18 Volts board to correct a false over-current shutdown problem. To determine if a false over-current is involved with these revision boards, you should perform the following test. You will be checking both channels of the 18 Volts power supply board:

- Power down the unit.
- Disconnect one LON cable from the Pump Node.
- Power up and check the two green LEDs on the M00050 18 Volts power supply board. If the two green LEDs are “ON”, the other channel is good.
- If both channels and if the 18 Volts power supply board pass the test, then a false over-current fault is likely occurring and you should clip off R9 to solve the problem.

Hydraulic Components

Meter Jump (SB1470)

Hose pressurization feature (CC 55) enacted: Previous software programming codes anticipated release of the feature, but it was never made functional. Hose pressurization is potentially useful for the following conditions:

- Extremely cold temperatures resulting in sale indication when the nozzle hook is activated but the nozzle is closed (commonly called meter jump)
- Infrequent intermittent problems with check valves, significant temperature changes while dispenser is inactive, large temperature differences between tank and ambient temperature, and other unusual conditions that may affect calibration.

Three options exist for programming (for current versions of software and firmware, this feature is automatically enacted and cannot be programmed):

- Option off (default)
- Unit is inactive for 10 minutes
- Unit is inactive for 30 minutes

The option should not be used as a fix for defective leaking check valves, vapor hoses or nozzles which can affect calibration or sale indications with the nozzle closed after the unit has dispensed fuel. Refer to MDE-3860 Programming Quick Reference Card for information regarding calibration.

Software/Firmware

Preset Overruns, Encore 300 (SB1465)

The information in this Service Bulletin applies to: Encore 300 Single-Hose Selectable Blenders with Proportional Flow Control Valves manufactured after 4/26/03.
V15.0.95 Encore 300 software has been released (K93734-701) to production and fixes the following issues:

- Preset over runs and Error Code 46
- Fixes problem with Hose Pressurization not working on side B.
- Changes CC24 FC 1 to 10 minutes

If you are having any E300 Models NL (1-3) 3 or NN (1-6) 4 experiencing Preset overruns or displaying Error Code 46, upgrade the software to v15.0.95 (K93734-701). Once the software has been installed, re-program the dispenser as needed.

In addition, V15.0.91 is required for any units having preset issues that are controlled by a Wayne Nucleus or NCR POS.

Error Code Explanations

31 and 35 for Encore 300 (SB1478)

- Error Code 31 = Totals Data Error
- Error Code 35 = Configuration Data Error

Error code 31 and 35 cannot be removed by a warm start or a cold start/master reset. Troubleshoot the error in the following order:

1. Record all totals.
2. Perform Command Code 6, Function Code 1 through Manager Keypad.
   Note: A Command Code 6 works only if error code 31 or 35 occurs.
3. Re-program the unit, re-enter previous totals.
4. Check for loose cables.
5. Investigate other problem possibilities, if error code 31 or 35 reappears again later.

   Error code 31 or 35 can be caused by various problems (noise, a bad controller board, loose cables, bad controller board battery, and so on).

   Always perform Command Code 6 first before warm starting, cold starting, or replacing any parts. Refer to “Command Code 6: Clearing Memory” on page 5-14.

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